33rd YEAR

CHEMICAL WEEKLY

VOL. XXXIII NOVEMBER 3, 1987 NO. 8

8.22

C.F.T.R.I. MYSORE

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500 ml
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CH₃CN
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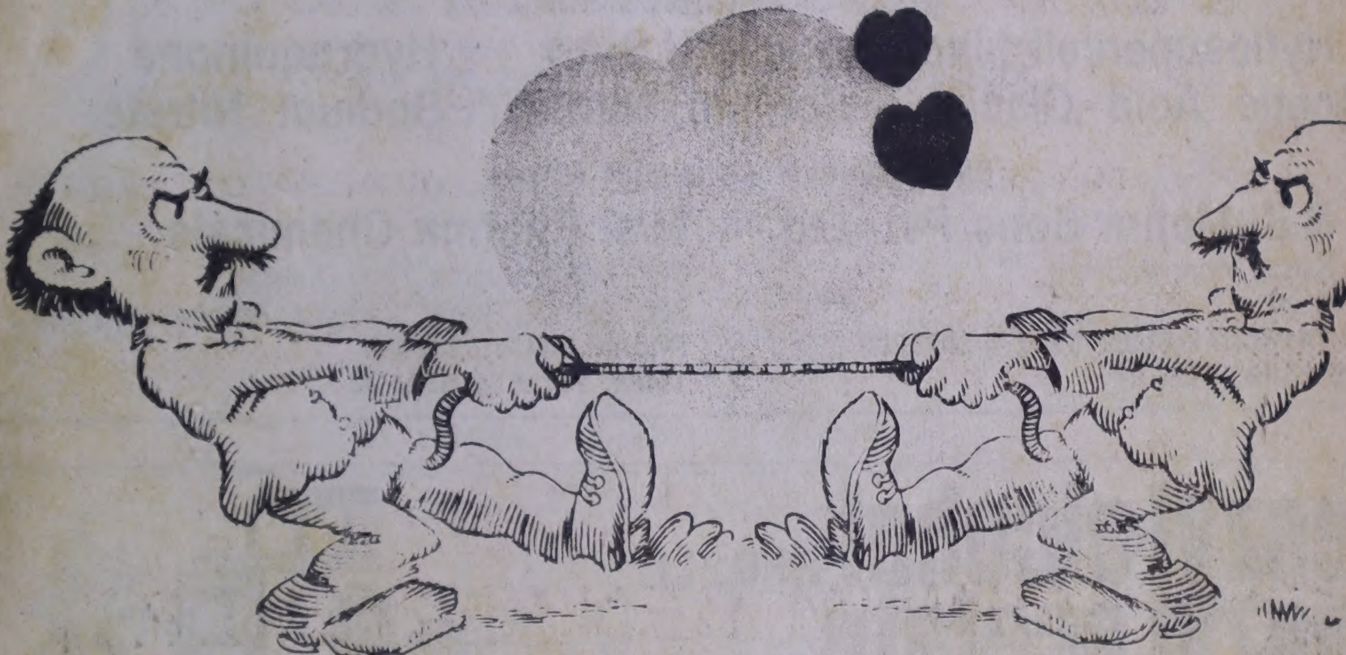

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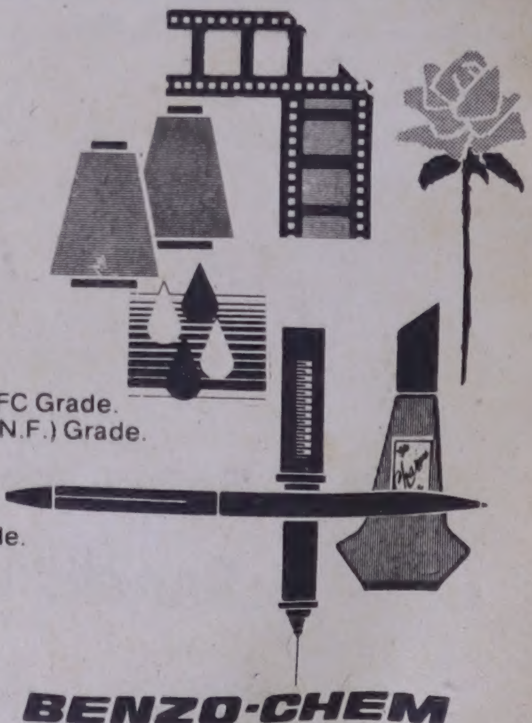

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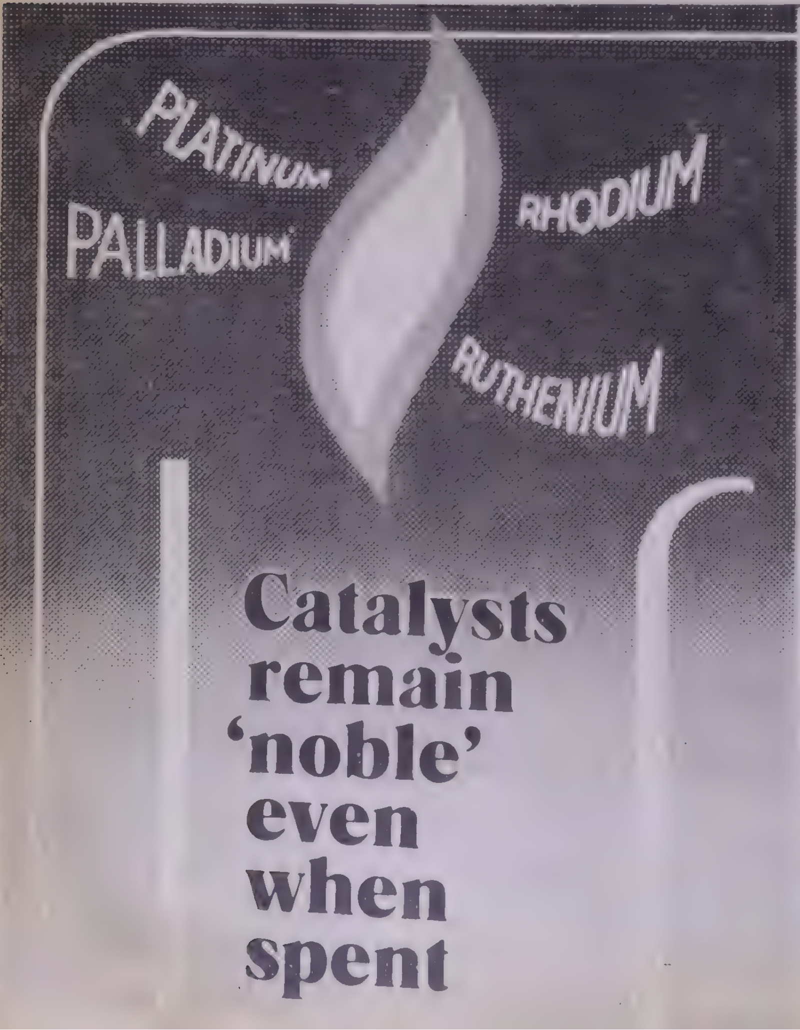

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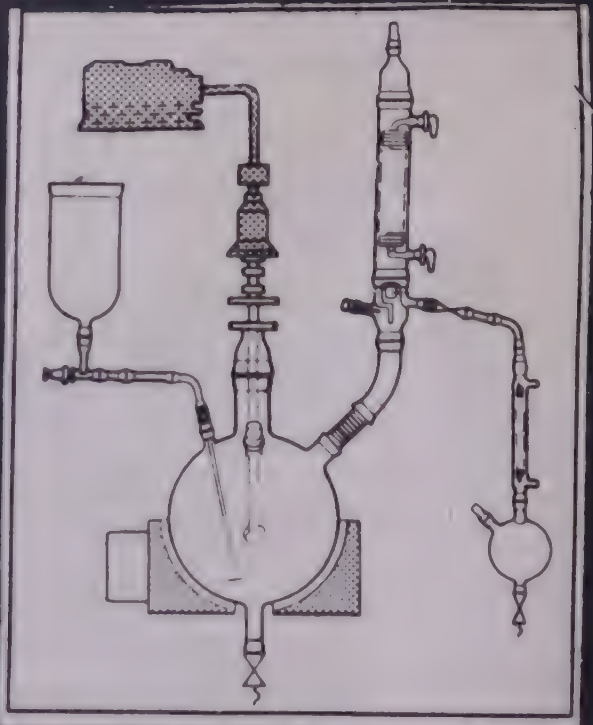

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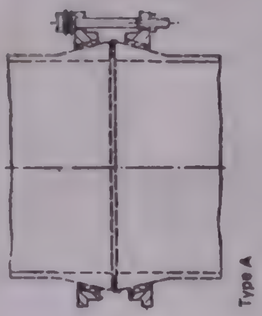

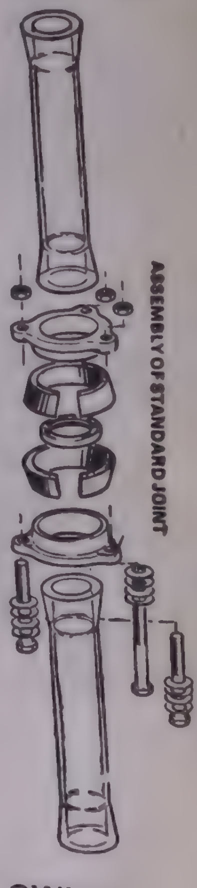

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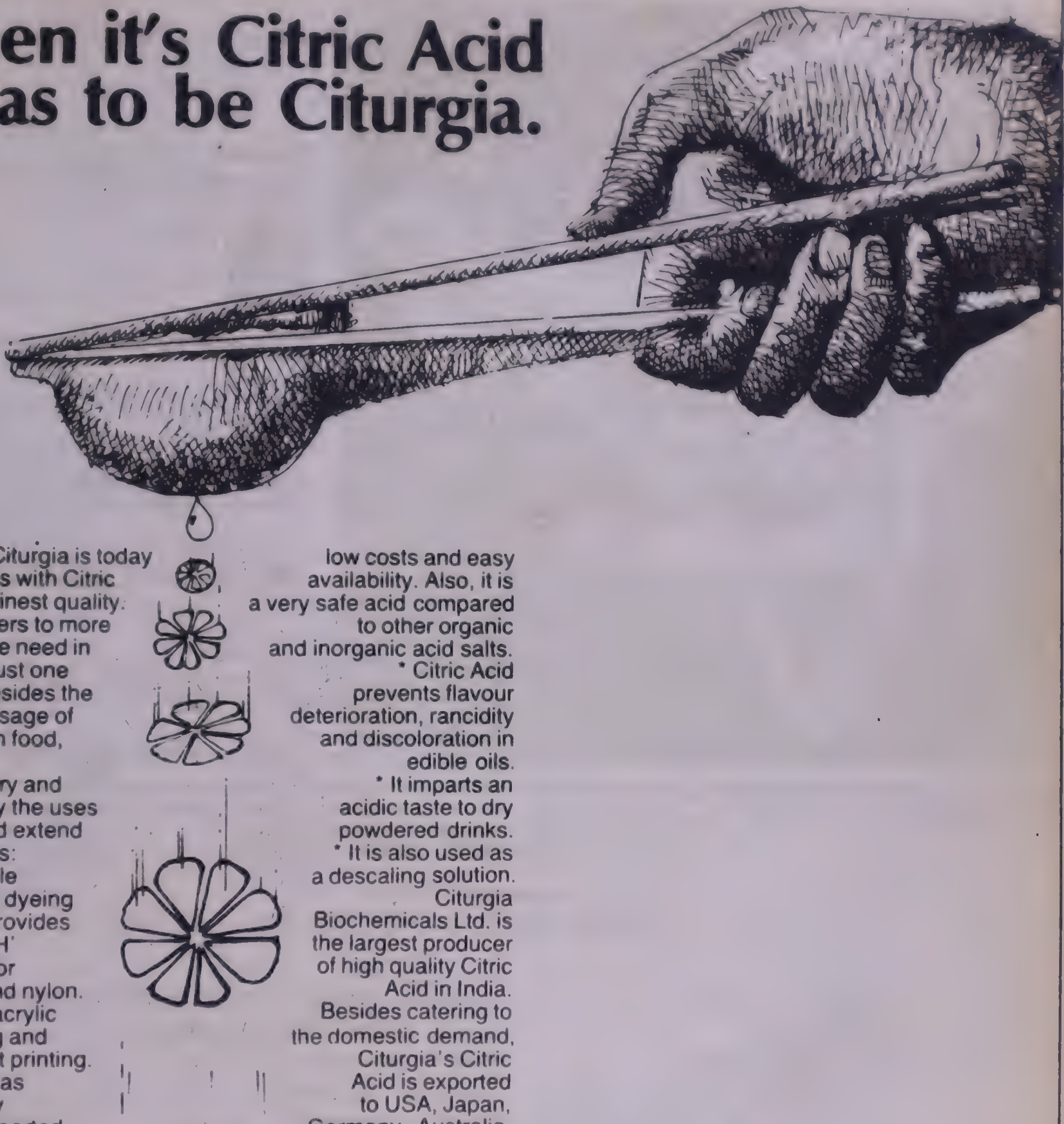

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MAINTAINING IT
IS WHAT KEEPS US
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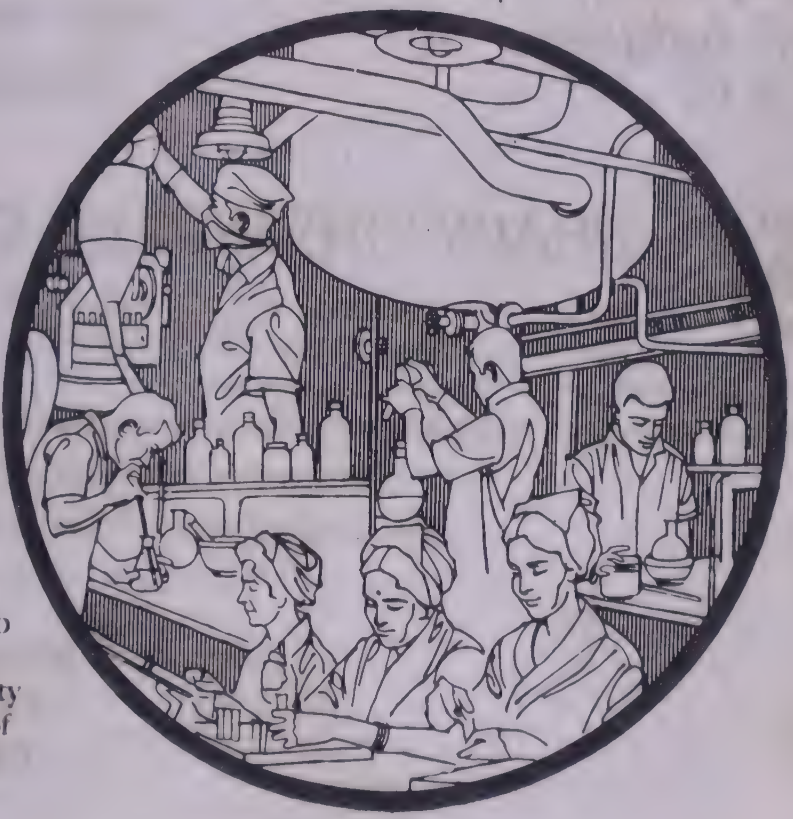

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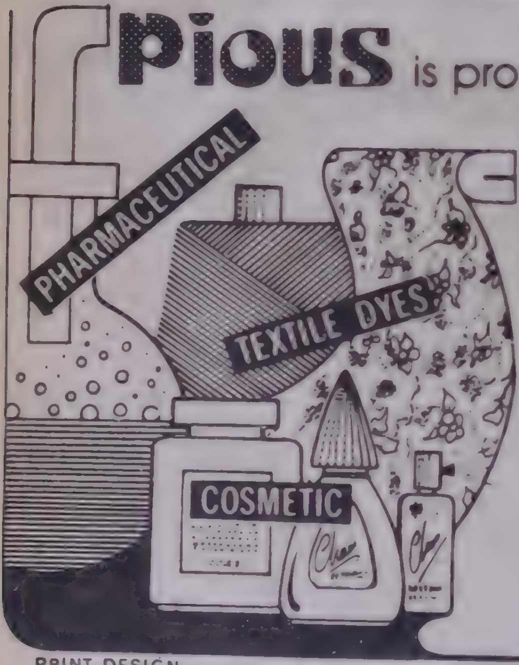

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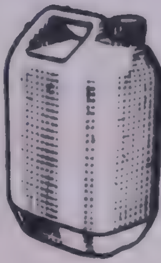

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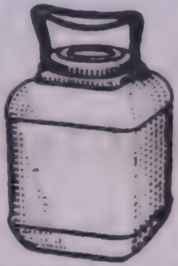

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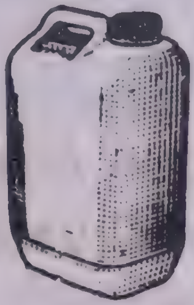
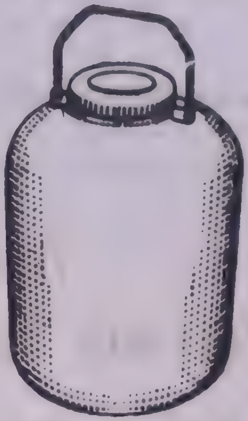


10 Litre Capacity Jerrycan



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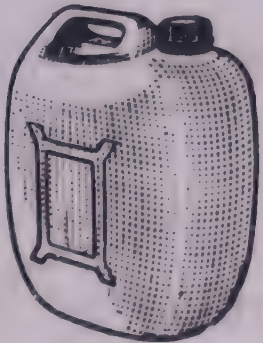

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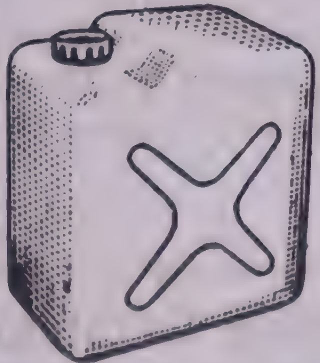

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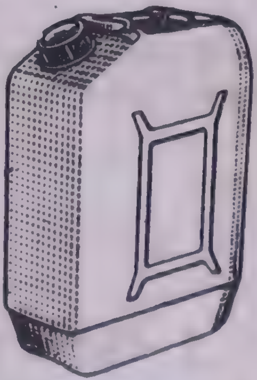

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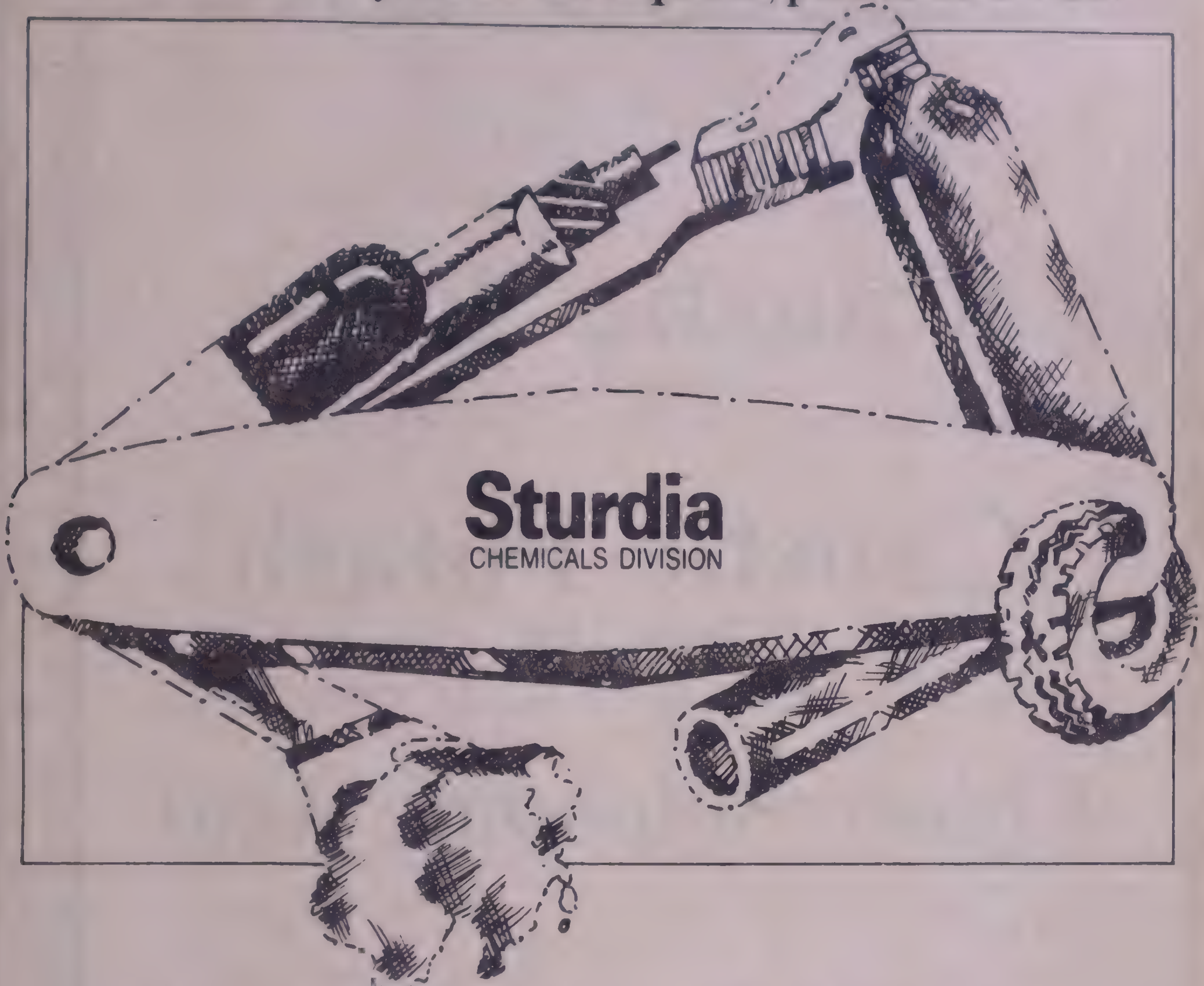

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Changing trends of the Chemical Industry and the role of the Technical Journalist

Techno-economic journalism in India reflecting the growth of the chemical industry is more than three decades old but individual Western countries can claim a much longer record in this field. On the other hand European Chemical News (ECN) mirroring the growth of the industry for the European continent as a whole has just completed a quarter of a century of distinguished service to the industry early this year.

In an introductory article entitled "A mirror on the industry", its editor Lyn Tattum modestly states that while some may call the journal the bible of the chemical industry, she is satisfied with the view that the magazine carries a voice of authority that is recognised by executives around the world.

The editor claims with justifiable pride "we have followed markets up and down, tracked the birth, progress and sometimes the death of new projects around the world, with relentless precision, reported on legislation that has touched the industry, seen the arrival of newcomers from the East Block or the Arab World, witnessed the emergent wonders of biotechnology and seen the chemical industry attempt to reshape itself in accordance with today's business environment.

The basic role of the journal as envisaged by the succession of five editors during the 25 years period has been to document the development and interface of the chemical industry with the wider happenings in the political, economic and social world.

For the reader it is important to have a magazine that reports and analyses with objectivity and which puts him into contact with the events and changes that take place in the chemical arena. In the early sixties, when the ECN was started, the technological side of the industry was still in the ascendancy.

New processes were being developed and new projects abounded. In the early days of technical journalsm, the authors had more often than not come from posts in the chemical industry and were perhaps engineers or marketeers. Their approach was more technical than popular. This created an impression that the technology was shrouded in mystery and even the chemical press was not infrequently looked upon with some suspicion.

Many members of the staff had a chemical engineering background with latent but undeveloped flair for journalism. The authors spent long hours studying process routes in order to produce in depth analytical articles. The commercial side virtually had to take care of itself.

Change first set in at the turn of the sixties; conventional technology had reached its peak and companies developed their major research efforts to manufacture their products as economically as possible. This early emphasis on process technology and economies of scale had to give way to a focus on marketing and business matters in the subsequent decade. With growing R & D efforts, the press had to bring out the operations of individual manufacturers and their influence on markets.

It soon came to be realised that the World today is increasingly becoming one market. There is little that occurs in America or Asia that is not of interest to a European chemical company. The change in emphasis towards the commercial side of the chemical industry offered new vistas of marketing trends. The market trends concept was taken up by data base operators and other observers. A new specialised branch of journalism of news-letter publishers became an important feature of the industry.

With individual countries of Europe under the private sector developing on their own, the notion of the cartel came to be widely accepted in the European chemical industry while on the other side, the Americans claimed to have eschewed the cartel.

Adam Smith in his "Wealth of Nations" noted "People of the same trade seldom meet together, even for merriment and diversion but the conversation ends in conspiracy against the public or in some contrivance to raise prices". Recent reports of the Commission of the European Economic Community indicate that the position has not changed much.

The industry itself has undergone a metamorphosis during the past three decades, steering away from production of traditional, less profitable heavy chemicals towards more sophisticated and lucrative speciality and consumer business such as pharmaceuticals or paints.

Sir Jack Callard, Chairman, ICI from 1971-75 made an illustrative comment when he recalled that "In the mid 60s pharmaceutical products were losing 250,000 Pounds a year and were thought of by some to be and likely to remain ICI's contribution to social welfare; to day the shape of the company has changed such that pharmaceuticals contribute around 30% of profits.

Dr. Duncan Davis, President of the Society of Chemical Industry and a seasoned industry observer says "it is going to be different. The next 25 years may bring even more unforecastable changes than the last". The question that arises is that whether a technical journal can play the prophet and anticipate the shape of things to come.

Chemical industry which has been built on continuous change has shown refreshing signs of fighting off the potential impact of rigor mortis. It has learnt that it is only by invention, development and change that it could survive.

The problems that used to worry the industry most were in those earlier years related, more to the ability to build and invest fast enough to obtain slow delivery items such as stainless steel and drive process development along with general theme of economies of scale.

Mistakes were seldom made by building units that were too large because growth in market demands came to the rescue.

Those were the days when most manufacturers endeavoured to develop their own national market. This led to the proliferation of producers in Europe of ever product, a situation from which the industry had pain fully to struggle back.

The two most striking extreme changes that hav affected growth are reduced distribution costs, wid unanticipated variations in exchange rate.

These factors forced a regrouping of busines for restructuring of the entire European chemical industr and work to cross borders not only of national value and thinking but of company cultures.

Western Europe has one of the largest chemica industries in the world. Western Europe and the US ar each estimated to supply 27 per cent of the world chem ical output. Seven of the world's ten largest chemica companies are European. Major European companie operate on a worldwide basis with affiliates in ever corner of the globe.

Chemicals form the third largest industry in Wester Europe, representing about ten per cent of total mar ufacturing output in terms of value added products. Th chemical industry acts as a production engine. By addin value to raw materials it provides benefits to its custom ers in the form of sophisticated products and improve processes. Despite being hit by two oil shocks over th past 12 years, the industry has maintained a rapid pac of growth compared to others.

The growing necessity to find alternate renewab resources, sugar, starch, oil and fats available und world market conditions has added an extra dimensio to the studies on raw materials.

Recent environmental events have had severe co sequences for the chemical industry as a whole ar have reaffirmed environmental interdependence Europe. The damage caused to the image of the cher ical industry all over the world by these environmen factors appears almost to be irreparable.

Thus the modern journalist venturing into this field h not merely to be a chemical engineer or manageme man but well versed in high finance and intricacies economies. He has to be a multifaceted personalit

It is virtually impossible to mirror clearly and acc ately the many facets of this most flexible, most use and ubiquitous industry, yet beset with potential hazar This is indeed the most challenging task faced by a modern journalist who ventures to interpret the char ing trends of this industry. -- T.P.S. RAJA

CHEMARENA

S.L. VENKITESWARAN

Some Useful Process Developments

The conversion of butane and propane into aromatics is the result of a joint R & D programme of British Petroleum and UOP. The successful conclusion of trials on a pilot scale has led to plans for a commercial plant of about 100 tonnes a day at a refinery in Illinois, USA. The process is based on a specially developed zeolite catalyst of BP and is said to give high conversions and selectivity for benzene with hydrogen as coproduct. Continuous regeneration of catalyst to burn-off deposited carbon is necessary and the designs for this are provided by UOP. Hydrogen from the process is expected to be useful for the refinery and this process termed CYCLAR is said to be appropriate for refineries with surplus C_4 and C_3 from FCC operations.

The recent decisions of revising the vapour pressure of gasoline in USA is likely to create a lot of surplus butane. Conversion of isobutylene to MTBE is a way out as it fits into the scheme of lead-free gasoline. The process for MTBE can use a mixed C_4 stream from cat cracking or naphtha cracking (after butadiene removal) and leaves residual normal butenes for other uses. An interesting development in this connection is the isomerisation of Butene-1 to Butene-2. Separation of n-butenes is difficult and recent developments on newer solvents have helped separation for processing to Sec Butanol, which is the intermediate for MEK -- methyl ethyl ketone. Sec Butanol is now possible also by direct hydration of n-butene without going through the sulphuric acid process, by using strongly acid cation resins as per process of Krupps Koppers.

MTBE is also proposed as a way of getting pure isobutylene from spent butenes. On cracking MTBE with a solid acidic catalyst isobutylene is formed and methanol which can be recycled to the MTBE section. Isobutylene is a new starting material for methyl methacrylate.

There is more and more interest in the most value-added products from the naphtha cracker and full utilisation of all the cracked products to maximum advantage. The C_4 stream after removal of butadiene has been a drag because of the three components -- isobutylene and the Butenes 1 and 2. The MTBE process helps to recover isobutylene as a saleable product MTBE or as a way to pure isobutylene for further conversion. The isomerisation of butene-1 to butene-2 in a new process helps in higher value products. Butene-1 is used as a copolymer in polyethylenes while butene-2 is converted into the useful solvent MEK. A further development is in metathesis or a different olefin from two starting olefines. Ethylene and butylene can be converted into propylene by a process of Institute of Petroleum, France, said to be in operation in Taiwan. This uses a different catalyst and milder conditions than an earlier process of Phillips Petroleum. There is a further development by IFP called Alpha-butol which dimerises ethylene to butene-1 and is reported to be negotiated for the MGCC complex in India for a 15,000 tonnes butene plant.

There are continuing developments in the field of basic olefins and aromatics from naphtha crackers and onward conversion. The binding of catalyst to a carrier is well-known. Similar is the arrangement of enzymes to carriers in different ways, physically or through bonding. Now it is reported that catalysts of precious metals like Rhodium have been successfully embedded in polystyrene film. The triphenyl phosphine -- Rhodium complex has been used in this way for the oxo process -- hydroformylation of propylene by synthesis gas -- n the gas phase itself at atmospheric pressure and 65°C. Details of reaction rates etc. are not yet available.

Such polymer embedded Rhodium is said to be used in the carbonylation of methanol. Rhodium/Copper catalyst impregnated into silicone rubber between films of polystyrene is said to oxidise propylene to acetone or butene to butanone (MEK).

C.A.D. for Molecules

Computers have taken over most routine jobs and have been steadily encroaching on the privileges of intellectual design areas. The microprocessors for process control is now used in all major projects and provide instantaneous sensing of prescribed parameters and appropriate responses as a matter of routine. Computer Aided Designs of machinery and equipment has been adopted by most of the design engineering organisations. But probably the most important development today is the potential for CAD of organic molecules. The presentation in three dimensions of molecules has advanced by leaps and bounds and there is "on-line" service for giving the complete multicolour presentation on the monitor screen of the required molecules.

But now are we on the way to computerised designs of molecules and possible creation of therapeutant or pesticidal molecules of desired properties. Is it likely to lead to a multitude of compounds over the next few years, that can improve the current therapies and offer hopes of treatment of diseases like AIDS and cancer? A brief analysis in Chemical Business of April 1987 summarises the present picture.

CAD of molecules cannot reach their potential until more basic data about molecules and their interactions on biological processes are available to researchers. The design and projects are based on the inputs which have to be very detailed. "Building new drug molecules or modifying present ones, then testing their biochemistry, chews of huge chunks of information long before a compound can be formulated for clinical trials". The time and costs of testing and data presentation according to the FDA regulation cannot be short-circuited even if the computer predicts that the new compound will be better. Organic compounds are very closely linked to one another and the removal of the hydrogen atom from a base chain can make great differences in physical properties and electromagnetic characteristics of even a large molecule, let alone the protein molecules which control all the bio-reactions. The limitation is said to be the storage disks for large volume data and the limit on how much faster a computer can be run to coordinate all the relevant data.

But there is a push towards expanded data that can be packed into discs and chips. Software programmes are the key to combine human reasoning power into a set of decision or inference rules. There is need for extensive cooperation of several industries and a sort of consortium of chemical, pharmaceutical and computer companies to study the potential energy functions of various molecules. It is reported that top companies like Abbott Laboratories, Monsanto, DuPont, Upjohn and the supercomputer experts Cray Research, Minneapolis are among the sponsors of such a project. The bonding energy information expressed as mathematical equations is essential for any programme that can simulate and predict the properties of molecules and the effect of alterations. Force-fields and bonding energy calculations are relevant to pharmaceutical research where drug receptor bonds are weak for virtually all known drugs. Biosyn Technologies of San Diego, CA is the software developer taking the lead in this.

Out of the millions of protein molecules, only a tiny fraction have been investigated on their crystalline structure and energy levels and the requisite 3-D maps are said to be stored in the computer memory, but the database continues to grow. Cambridge Crystallographic Data Centre in England is said to be the leading repository in the world for data on molecular structures of organic molecules. Others like Protein Data Bank at Argonne National Laboratories, the Protein Sequence File at the National Biomedical Research Foundation Washington are also active in expanding the database Software programmes are also being written to get a codified set of decision rules. May be it will be possible to get a computer programme to suggest what the resulting properties of a molecule will be if a particular atom or chain of atoms are removed and substituted by others -- which is the basis of pharmacology. But that day is not near though there are many active operators.

A programme for DNA and RNA sequence data handling is said to be available but tapping dense electromagnetic memories and simultaneous processing of a number of tasks and data is necessary to arrive at and select the alternatives in any given decision point on the logical chain. The Reduced Instruction Set Computer --RISC machine design is said to be a concept that is being tried out. Speed may not be important in processing for CAD of molecules but cognisance of all relevant data and their evaluation is a must. It is hoped that molecule researchers can soon have expert systems and programmes to assist them but CAD of pharmaceutical molecules is not for the near future. But some lines of research specifically to a restricted area is going on, for example: attempts to modify the digitalis compounds for congestive heart failure by the study of the receptor site in the enzyme concerned. Computer Aided Design for molecules is an area which can be expected to play a major role in evolving some new active and safer products in the next decade.

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RCF planning unit in West Asia

Government-Owned Rashtriya Chemicals and Fertilisers Ltd (RCF) is exploring the possibilities of setting up joint sector, gas-based fertiliser plants in West Asia.

The company, which has been consistently making profits since its establishment nine years ago, has drawn up big plans for diversification of activities into non-Fertiliser areas as well.

If will soon be negotiating with the Bharat Electronics Ltd (BEL) for the acquisition of a BEL unit set up at Taloja near Bombay to produce television picture tube components.

The company is also keen to enter the petrochemicals area, RCF chairman and managing director Duleep Singh told newsmen at New Delhi.

The unit for producing picture tube components — for black and white television sets — would involve an investment of Rs. 50 crores for a production capacity of one million to start with. Later, Mr. Sngh said, it would be expanded to nave a capacity of two million with an additional investment of Rs. 17 million. For making components for colour television sets he said, a further investment of Rs. 75 crores would be needed.

Another exciting area which the RCF is keen to enter is the manufacture of methanol as automobile fuel. Methanol would be added to gasoline so as to reduce the pollution in the city streets. This would also help in conservation of petroleum. Research in this field was underway, and much would depend on the results of the research, Mr. Singh said.

As part of the expansion plan of RCF, the government has approved a Rs. 100-crore scheme for revamping and modernising its existing 25-year-old plant at Trombay.

Mr. Singh said despite the drought and stiff competition in the fertiliser market, the company's sales totalled 1.1 million tonnes in six months this year compared to 560,000 tonnes in the corresponding period last year.

Production in the first six months this year was also a record. In terms of NPK, production was about 500,000 tonnes, as against 400,000 tonnes in this period last year.

Mr. Singh said in spite of the good sales, the stock position was very high. It was 1.1 million tonnes, estimated at Rs. 320 crores.

He said RCF was authorised to sell during the current rabi season one million tonnes of fertiliser which was equivalent to six months of its production. Therefore, the high inventory position would continue for sometime to come, he said. He suggested that for one more year, there should be no import of fertilisers, so that the indigenous fertiliser manufacturers could liquidate their surplus stocks.

The company made a gross profit of Rs. 195 crores last year and a net profit of Rs. 20 crores. The same profits were expected to be maintained this year despite many unfavourable factors like sale discounts and high warehousing costs.

UNITS NEAR GANGA ASKED FOR DETAILS

The Supreme Court directed each of the local bodies and authorities having jurisdiction over areas through which the Ganga flows, to file separate affidavits by December 2, explaining the steps taken to keep the river pollution-free.

A division bench comprising Mr. Justice E. S. Venkataramiah and Mr. Justice K. N. Singh observed that the affidavits should furnish information regarding the anti-pollution works already undertaken by them, the amounts set apart for the works in tho current financial year, the names of the agencies and contractors through whom they were getting the works completed and other necessary particulars.

While listing the petition filed by a Supreme Court lawyer, Mr. M. C. Mehta, for further hearing on December 8, the judges asked the Uttar Pradesh pollution control board, the home, department and the local self department of U.P. to file their affidavits by December 2.

GNFC SETTING UP JOINT VENTURE PROJECT IN UAE

The Gujarat Narmada Valley Fertiliser Company (GNFC) and Mozak-International Inc. of the UAE are setting up a joint venture called Emirates Narmada Industries Plc in Abu Dhabi.

The company, to be set up in Jebel Ali, has awarded the contract for its sulphuric acid and phosphoric acid complex to Lurgi GmbH, Frankfurt, according to a press release from their Indian associates, Lurgi India Company.

The company's products — sulphuric acid and phosphoric acid — will be exported mainly to India. Lurgi s work includes process design, engineering, procurement, commissioning, and training of personnel, the release said.

For GNFC, the venture is a further step towards bilateral co-operation between India and the UAE and towards diversification of its product lines.

The complex will hvae a capacity of 500 tonnes per day and would include a sulphuric acid and phosphoric acid units, utility systems and offsite facilities.

COAL PRODUCTION DURING THE SEVENTH PLAN PERIOD

According to the Mid-Term Appraisal exercise carried out by the Coal India Limited and Singareni Collieries Company Limited, the coal production in 1989-90 is estimated to be 214.8 million tonnes as against the Seventh Plan target of 220 million tonnes fo Coal India Limited and Singaren Collieries Company Limited put together. Thus a marginal shortfall o 5.20 million tonnes is likely to occu in coal production in 1989-90. The coal companies will make efforts to make good this shortfall by taking steps such as, accelerating pace o development of ongoing projects and by putting constant pressure on projec authorities for expeditious completio of projects. Efforts are also being made to expedite supply of equipmen by close followup with concerne Ministries and project authorities an land acquisition for coal project through assistance of State Governments.

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CHEMEXCIL PERFORMANCE:

Dyestuff exports touch Rs. 98 crores

Exports of dyes and dye intermediates have contributed to about 18% of the total exports of CHEMEXCIL's items during 1986-87. From modest exports of Rs. 1.12 crore in 1963-64, the exports of this panel have reached a record figure of Rs. 98.7 crores in 1986-87. Products covered under this panel could be broadly divided into two major groups viz. Dyestuffs and Dye Intermediates and the break-up of export in respect of each group for the past three years are as under:

Items	1986-87 (Est.)	%	1985-86 (Est)	%	1984-85 (Est)	%
Dyestuffs	6738.0	68.3	3117.3	67.8	3343.5	74.1
Dye Intermediates	3129.8	31.7	1478.9	32.2	1169.8	25.9
	9867.8		4596.2		4513.3	

Major items which have contributed for this excellent performance are Organic Pigments, Reactive Dyes, H. Acid, Metanilic Acid, Azoic Acid, Gamma Acid, Vat Dyes, and other Dye intermediates. The important items whose export performance during 1986-87 as compared to 1985-86 registered a fairly good increase include the following :

1. **Organic Pigments:** Exports of Organic Pigments have reached a record figure of Rs. 15.50 crores in 1986-87 from Rs. 5.28 crores in 1985-86 registering 155% increase. Major buyers were Italy, Netherlands, Australia, Hong Kong, Thailand etc.
2. **Reactive Dyes :** Exports of Reactive dyes have shown substantial increase during the year under review, exports being Rs. 12.0 crores in 1986-87 as compared to Rs. 5.9. crores in 1985-86. Major buyers of this item were Belgium, Netherlands, UK, USA West Germany, Indonesia, Banladesh, Switzerland, Hong Kong, Australia etc.
3. **Vat Dyes:** Exports of vat dyes have increased substantially from Rs. 1.67 crores in 1985-86 to Rs. 8.75 crores in 1986-87 registering an increase of about 423%. Bangladesh, Thailand, Netherlands were the major buyers.
4. **H. Acid :** Exports of H. Acid increased from Rs. 3.6 crores in 1984-86 to Rs. 8.5 crores in 1986-87. USSR, USA and Netherlands were the major buyers.
5. **Metanilic Acid:** Exports of Metanilic Acid have shown marginal increase from Rs. 1.56 crores in 1985-86 to Rs. 1.59 crores in 1986-87. Belgium, Netherlands, USA, UK, Italy, Japan were the major buyers.

On the contrary, a few items suffered a decline in exports during 1986-87 as compared to 1985-86. Some of these items are listed in the table below :

(Rs. in '000)

Items	Exports During 1985-86	Exports During 1986-87
Acid Dyes	13297.4	3792.7
Direct Dyes	20732.4	9324.9
Benzidine Dihydrochloride	5160.4	1761.2
Chicago Acid	8145.7	147.2
Laurent's Acid	8323.8	1233.8
Peri Acid	5666.1	1559.8
Anthraquinone	14395.5	7766.7

Speaking at the 24th Annual General Meeting of the Council, its chairman Shri Ramu S. Deora said:

"The present spurt in export demand for dyes and dye intermediates offers an unprecedented opportunity for the industry to achieve export level hitherto taken by advanced countries of West Europe and Japan. The total dyes production and exports of India represent about 2.5% of world's total market. It therefore should not be a difficult task to increase this to 4 to 5 times. Therefore, there is a need to evolve a strategy for a high jump in exports in shortest possible time, th present euphoria and tempo will b short lived. The Industry has bee put to considerable strain in the recen past as a result of several fiscal levies The problems faced by the Industr have been taken note of by the gov ernment at the highest level and we may expect certain measures in the near future from government aimed towards rationalisations of the structural and other problems faced by the sector."

Exports of Basic Inorganic & Organic Chemicals Including Agro Chemicals

Exports of Chemicals which were hardly Rs. 1.2 crore in 1963-64 increased to Rs. 24.0 crores in 1979-80, to Rs. 61.9 crores during 1985-86 and finally to Rs. 66.2 crores in 1986-87. Compared to the exports of immediate preceding year which were placed at Rs. 61.9 crores the performance of 1986-87 registers an increase of about 7%.

On an analysis of groupwise exports, one could observe that exports of Inorganic Chemicals group and Organic Chemicals group have shown substantial growth during 1986-87 in comparison to their previous two years exports. Agro Chemicals group, however, suffered a set back from Rs. 39.77 crores in 1985-86 to Rs. 34.91 crores in 1986-87, which may be due to lesser offtake by USSR.

Some of the items which fared well during the year 1986-87 are mentioned below:

1. **Rare Earths Chloride:** Export of Rare Earths Chloride have increased from Rs. 4.9 crores in 1985-86 to about Rs. 7.00 crores in 1986-87. Japan. Canada, UK, G.D.R., USA were the major buyers.
2. **Nicotine Sulphate:** Export of Nicotine Sulphate have shown substantial increase from Rs. 3.12 crores in 1985-86 from Rs. 4.20 crores in 1986-87. Japan, UK, USA, Netherlands, G.D.R. were the major buyers.
3. **Meta Amino-Phenol :** Exports of Meta Amino Phenol have risen from Rs. 2.3 crores in 1985-86 to Rs. 3.7 crores in 1986-87. G.F.R. Japan, Italy, Malaysia were major bu

4. **Phthalic Anhydride:** Exports of Phthalic Anhydride have increased to Rs. 2.07 crores in 1986-87 from Rs. 0.21 crore in 1985-86. Taiwan & Jordan were the main importers.

5. **Calcium Dibasic Phosphate:** Exports of Calcium Dibasic Phosphate have risen from Rs. 0.8 crore in 1985-86 to Rs. 1.5 crores in 1986-87. Japan, Singapore, Australia, Malaysia, Thailand were the major buyers.

6. **Bleaching Powder:** Exports of Bleaching Powder have shown good recovery during the year under review. Exports have risen from Rs. 51.05 lacs in 1985-86 to Rs. 98.20 lacs in 1986-87. New Zealand, Singapore, Sri Lanka, Australia, USA, Netherlands, Kenya, G.F.R., UK, UAE were the major buyers.

7. **Rare Earth Fluoride:** Exports of Rare Fluoride has shown marginal increase from Rs. 51.17 lacs in 1985-86 to Rs. 63.26 lacs in 1986-87. Japan, Thailand, South Korea were the major importers.

8. **Red Phosphorous:** Exports of Red Phosphorous have shown significant increase from Rs. 21.63 lacs in 1985-86 to Rs. 53.15 lacs in 1986-87. USA, Singapore, Egypt were the major importers.

9. **Rubber Chemicals:** Exports of Rubber Chemicals have increased from Rs. 6.9 lacs in 1985-86 to Rs. 47.1 lacs in 1986-87. Sri Lanka, Hong Kong were the major importing countries.

18. **Dehydrated Culture Media:** Exports of Dehydrated Culture Media have shown marginal rise from Rs. 20.88 lacs in 1985-86 to Rs. 27.55 lacs in 1986-87. Japan, Malaysia, UAE, Nepal, Afghanistan, Sri Lanka, Switzerland were the major importers.

11. **Barium Carbonate:** Exports of Barium Carbonate have increased to Rs. 24.0 lacs in 1986-87 from Rs. 1.4 lacs during 1985-86. Taiwan was the man buyer.

LAGEST WIND POWER COMPLEX FOR MP

The largest wind power complex in the country will start production in June next year in Kukru village of Betul district in Madhya Pradesh.

A spokesman of the Madyh Pradesh Urja Vikas Nigam said that the 3.5 mw complex was being set up atop the Satpura range in Bhainsdehi tehsil near the Maharashtra boundary. He said 15 aero generators, having a capacity of 100 kw each, would be set up on seven hillocks.

The project would be completed in three phases. The first phase would cost Rs. 2.15 crore and the 1.5 mw power generated by it would be transmitted to the State Electricity Board grid, he said.

GULF OUTPUT ABOVE OPEC QUOTAS

Saudi Arabia has effectively told its OPEC partners that their failure to honour oil production quotas will make it impossible to obtain a price increase for another year, Gulf oil industry sources said.

The sources were referring to a statement by Saudi King Fahd on 26th October that he foresaw no increase in crude oil prices until the end of 1988. They said Gulf producers were still pumping oil above their self-imposed quotas despite appeals for discipline.

RAJA RAMANNA ON IAEA PANEL

Dr. Raja Ramanna has been elected chairman of the scientific advisory committee of the International Atomic Energy Agency (IAEA) for the fourth year in succession. Dr. Ramanna would leave on October 31 to attend the annual meeting of the committee at the agency's head-quarters in Vienna. The committee, consisting of renowned scientists from various countries, decides on scientific research programmes of the agency. Dr. Homi J. Bhabha was the only other Indian to have held membership of the advisory committee.

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TNEB plan to use Bhuvanagiri gas

The Tamil Nadu Electricity Board (TNEB) is likely to formulate a project report to use natural gas at the Bhuvanagiri oil well for power generation.

Indicating this, the TNEB Chairman, Mr. B. Vijayaraghavan, said at Madras on 30th October that the idea was to utilise the associated gas flowing out of the Bhuvanagiri oil well in Tamil Nadu, without wasting it through flaring at the well-site itself. Oil was struck a few days ago at Bhuvanagiri.

Inaugurating a BHEL-sponsored seminar on "gas turbines", he also said the proposed 5-MW gas turbine at Kovilkalappal in the Cauvery oil basin would be commissioned in about a year's time. TNEB had programmed to use the free-flowing natural gas from a well in Kovilkaiappal to produce power.

The Kovilkalappal turbine would produce 3.50 MW power, in tune with the gas availability for the turbine, though the latter was designed for a 5-MW capacity, he explained, and called on BHEL to make gas turbines of 3.50-MW capacity too, so that a wider power market could be catered to than at present.

Mr. Vijayaraghavan regretted that the Centre had not yet cleared the TNEB proposal for a 120-MW gas turbine station at Basin Bridge in Madras to replace the now-scrapped thermal station there. The proposal, submitted as early as 1963, had already been accorded the necessary technical clearance by the Central Electricity Authority.

Viewing the chronically deficit power scenario in the country as a whole in general and the southern States in particular, the TNEB Chairman said the Centre would do well to "give some more attention" to the use of natural gas for power generation. He also pleaded for a diversion of the HBJ pipeline to the southern States too.

He pointed out that according to an ONGC "conceptual" estimate, about 47 million cubic metres of gas per day would be available by 1990-91, which would increase to 77 million by 1996, and 100 million by 2001 A.D. The last mentioned figure could sustain power production to the order of 14,000 MW.

ALUMINIUM OUTPUT UP

Production of aluminium in the public and private sector plants during April-September 1987 was 123,598 tonnes as against 122,456 tonnes, during the corresponding period in 1986.

Indal produced 14,358 tonnes during this period compared to 9080 tonnes in the same period last year. The production by Balco during September this year has been 7500 tonnes while it was only 6508 tonnes in August. Hindalco and Indal have also shown substantial improvement in their production figures during September comparing the output during August.

The production of Gold by Bharat Gold Mines Ltd. (BGML) during September, 1987 was 73.854 kg as against 69.767 kg in August, 1987. The cumulative production of gold during April to September, 1987, was 380.623 kg as against 409.716 kg during the same period of 1986-87.

'POLLUTION LAWS WEAK : TYAGI'

The chairman of the central board for the prevention and control of water pollution, Mr. P. C. Tyagi, said on 28th October that the legislation on controlling pollution caused by solid waste and industrial effluents, was still ineffective and rules regarding it were not clearly framed.

Inaugurating a private Rs. 1.7-crore incineration plant, the first of its kind in India, at its unit at Thane, Mr. Tyagi said development and environmental protection were not in conflict. In fact development would be impossible without protection of environment.

He said the pollution controlling agencies have to act as guide, catalyst and finally as guards. He lauded Maharashtra as these roles were rightly being played in the state, which leads the country in pollution control measures.

He felt that education was needed to teach people as to the importance of pollution control.

Thane mayor, Mr. Vasant Davakhare, who presided, appreciated the company's attitude. He demanded that proposed expansion plan of the NOCIL on the Thane-Belapur road should not be sanctioned.

The chiarman, Mr. R. P. Goenka said the Bayer group has announced investment of three billlion DM this year in projects linked to environmental protection and safety.

A board member of Bayer AG (FRG, Dr. Ernst-Heinrich Rohe, said it was the company's policy to co-operate on the questions of pollution control.

MODVAT FACILITY FOR SMALL UNITS EXTENDED

The Government has extended the scheme of higher Modvat credit for goods purchased from small-scale industrial units till March 31, 1988, according to an official press release.

The scheme was to be withdrawn from November 1, 1987.

Under the Modvat scheme, duty paid on inputs is available as credit for payment of duty on the final products. Generally, the extent of credit is equal to the duty actually paid on the inputs.

However, in respect of inputs manufactured by small-scale units under the 'General small-scale exemption scheme,' the user industry can take full credit of duty leviable on the inputs even though the small-scale units have paid duty at the concessiona rates.

RANBAXY AWARDS ANNOUNCED

Two scientists each have been selected for the Ranbaxy research awards, 1986, for medical and pharmaceutical sciences.

The Ranbaxy award for medical sciences for 1986 has been shared by Prof. C. L. Pathak, emeritus medica scientists, and principal investigator DST project, medical college of Jodhpur and Dr. (Miss) A. K. Shuseela, associate professor of histocytochemistry, department of anatomy of the A India Institute of Medical Sciences.

The Ranbaxy research foundatio award for pharmaceutical sciences ha been shared by Dr. R. C. Srivastava professor of chemistry, Birla Institut of technology and Science, Pilani, an Dr. K. B. Mathur, head of the polyme divison at the Central Drug Researc Institute, Lucknow, according to foundation release at New Delhi o 27th October.

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Call to encourage aluminium use

The Aluminium Association of India (AAI) will be submitting in December a report to the department of mines on the potential for saving of the fast depleting forest wealth of the country by substituting aluminium for wood wherever it can be profitably used.

Mr. A. K. Agarwala, AAI president, told newsmen at Bangalore on 29th October that the report, which was still being processed, had identified huge savings of wood for applications like doors, windows and truck bodies. For instance, it had been estimated that over one lakh trees could be saved if the country-wide demand for window-frames for a period of 12 months was met by aluminium instead of wood. The savings ratio of aluminium as to wood was 1:5.

Mr. Agarwala said the report would also stress the ecological and environmental benefits by substituting the use of aluminium for wood wherever it was profitable. Mr. Agarwala noted that the association would also make a case for bringing down government levies to encourage the customer to go in for aluminium instead of wood. Japan, he said, had faced a similar situation of depleting forests in the sixties and had managed to overcome this by the fiscal measure of increasing the price of wood and reducing that of aluminium.

Mr. Agarwala noted that even otherwise, there was a genuine case for bringing down government levies on aluminium since the combined effect of excise duties and sales-taxes worked out to almost 40 per cent of the consumer price for the final fabricated product, even after allowing for modvat reliefs. He claimed that the excise duty for indigenously manufactured aluminium was almost four times as high as that of indigenous steel and three times that of indigenous copper. He wanted aluminium to be treated as declared goods like steel, with the duty being levied only once on the basic metal. There should, he said, be a specific duty on aluminium rather than an ad valorem one.

Mr. Agarwala noted that apart from the question of price there was also a question of availability. He noted that the country's per capita consumption of aluminium was only 0.38 kg as against 38 kg for some other developing countries. Despite having the fifth largest bauxite reserves in the world (2,000 million tonnes), India ranked only 16th in terms of aluminium production. Against an installed capacity of 3,62,000 tonnes, production during the last few years had ranged between 2,60,000 tonnes and 2,70,000 tonnes per annum. Since an average of 5.3 tonnes of bauxite was required to manufacture one tonne of aluminium, this meant that only 1.5 million tonnes of bauxite was currently being used for indigenous production of aluminium, as against the estimated reserves of 2,000 million tonnes. While bauxite was also being exported in bulk, this fetched only between US $10 to 12 per tonne, as against $1,900 per tonne of aluminium.

The primary reason for the non-utilisation of full capacity, Mr. Agarwala said, was the non-availability of continuous and steady supply of power, the most important component for the production process for aluminium. It had been estimated that 18,000 units of power were required for one tonne of aluminium and that if the power-tariff was increased by one paise per unit, the production cost would go up by Rs. 200 a tonne.

Mr. Agarwala noted that the aluminium industry had been badly hit by the power cuts, especially in states like Karnataka. The association had, he said, suggested to the Union government that in case the states could not supply enough power, the Centre should make an allocation for aluminium manufacturing units from the 15 per cent which NTPC projects kept for the core sector. Aluminium could be included in this category since, apart from the saving on wood, 50 to 60 per cent of the country's production was utilised by government bodies like the state electricity boards, the state road transport corporations and defence, a vital sector, Mr. Agarwala said.

Fortunately, the situation could improve since nearly all the large primary producers had either set up or were in the process of setting up captive thermal generating stations. By the time the Nalco plant came into full production, he estimated that 85 per cent of the country's production could be achieved through captive power.

Mr. Agarwala however regretted that some states were even levying electricity duty ranging from six to 1 paise per unit of captive power produced. "This kind of electricity duty and high tariffs will kill the industry,' he warned.

Looking at the future, Mr. Agarwala stated that the aluminium availability position would change when the Nalco plant, which had an installed capacity of 2,18,000 tonnes of primary metal per annum, came into full production. By 1989-90; the availability scenario would change from one of shortage to surplus, with an anticipated indigenous production ranging between 4.8 lakh tonnes to 5 lakh tonnes. By the turn of the century, indigenous production was expected to be around million tonnes. In this context, he stressed the need for developing plants for the future.

INEXPENSIVE ANTI-TYPHOID VACCINE DEVELOPED

A new inexpensive vaccine can largely prevent typhoid fever withou causing side-effects that have undermined earlier efforts at controlling the illness, researchers say.

In tests in Nepal, the vaccine was 75 per cent effective in stopping the disease which, according to one estimate, strikes 50 million people annually.

Dr. Julie Parsonette of the division of bacterial disease at the US centre for disease control said the risk o typhoid is highest in Asia, South America and Africa.

Unlike many vaccines, this new vaccine does not require refrigeration o other special handling, and doctor using injection guns could give 1,20 shots per hour. Cost was placed at on US cent per shot.

The vaccine was developed by Dr John B. Robbins and colleagues at th National Institute of Child Health an Human Development. A report on i experimental use was published New England Journal of Medicine.

The vaccine is a purified concentration of the outer capsule of the typhoid bacterium, a germ called Salmonella Typhi. This material, known Vi (for virulence), prompts the bod to produce antibodies that kill the t phoid microbe.

The new vaccine, which has n been approved for routine use, prov des protection after one injecton, an the immunity lasts at least three year No one tested had a serious reactio to it, and there have been few min side-effects.

'RATIONING' OF SUPPLIES

Fertilizer units perturbed

Fertiliser manufacturers in the country are concerned over a new regulatory move by the Government which amounts to 'rationing' of fertiliser supplies.

According to industry sources, the Government has recently brought the distribution of fertiliser under the Essential Commodities Act. Under the new dispensation, the manufacturers are allowed to sell only 60 per cent of their production during the current rabi season (October 1987 to March 1988) and the balance of 40 per cent had to be carried forward as inventory.

It is pointed out that the new measure will to a large extent nullify the good work done by the Government recently in containing the unhealthy price competition among the domestic manufacturers and thereby restoring order in the market. Also, it will entail uncertainties on the agricultural front in the matter of timely supply of adequate quantities of fertilisers.

It may be recalled that the industry had lost nearly Rs. 400 crores due to reckless price cutting among the manufacturers in the wake of an unprecedented glut in the market. The situation arose out of an imbalance between consumption and availability with larger imports and higher domestic production on one hand and poor growth in consumption on the other.

The Government, however, has since come out with a series of measures to curb this which include withholding of subsidy bills as a penalty against erring manufacturers and limiting the equated freight subsidy to the previous year's admissibility based on district-wise allocation.

On the issue of imports, the Government has acted, though belatedly, to defuse the situation by initiating certain steps. Imports have been restricted to countries with which bilateral contracts are in existence. Besides, the concept of imported fertilisers being used as residual buffer to bridge the gap between domestic production and consumption has been revived.

Despite all these, the industry has continued to be in the grip of a major problem in the form of inventory. The Government has not compensated, in spite of vociferous demands, for the huge inventory carrying cost of indigenously produced fertilisers and what has been provided in the retention price structure is felt to be negligible.

In the cirumstances, the new distribution policy is feared to once again upset the market calculations. This is particularly so at a time when cropping activities are kept in a state of suspended animation awaiting the sudden burst of rains.

Industry circles argue that the manurial season will get out of hand by the time the manufacturers are able to get the Government permission to move fertiliser to a needy spot in excess of the allocated quota. This will result into a paradox of 'rationing' supplies in the face of plentiful availability.

They feel the Government should remove the 'rigidity' without sacrificing the basic objective of preventing the manufacturers from indulging in long-distance transports to remote places. They suggest this could be done by fixing the home State and one or two neighbouring States as the 'core market' for each manufacturer giving them the freedom to sell fertilisers in excess of the allocation if the situation warrants.

In the case of secondary markets, the Government may continue to have the restriction.

GAS LEAK NEAR CALCUTTA

Police are continuing a vigorous search to locate the source of a poisonous gas leak that created severe panic at the Sakherbazar-Silpara and its adjoining areas in Behala near Calcutta, recently, the superintendent of police, South 24 Paraganas, Mr. Abani Joardar said.

Police and fire brigade personnel were pressed into service and hundreds of people were seen rushing out of their homes in panic as the intensity of the gas in the air was severly felt and it spread to different parts.

Many of them complained of irritation of eyes, respiratory troubles and nausea.

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No Settlement yet in Bhopal case

An out-of-court-settlement in the Bhopal gas disaster case does not appear likely before the October 30 deadline set by the District Court in India representing the victims of the gas leak and the defendant, Union Carbide, to come to an agreement so that speedy relief and compensation could be provided to the victims.

The U.S. lawyer, Mr. Bud Holmen, appearing for the multinational company, said that the process was on towards arriving at a settlement which would help provide relief to those 'genuinely affected'. He did not disclose the amounts which either side was currently putting forward in the negotiations, but pointed out that 'responsible people' from either side were involved. He seemed to imply that in his opinion those representing the Government of India had the authority to settle the issue. However, the term 'genuinely affected' would appear to be the stumbling block as the two parties have differed fundamentally on the nature and extent of injury caused, and the number of people affected. While the Government of India and many non-governmental activitists have accused Carbide of grossly underplaying the harmful effects of the gas which leaked from the Bhopal plant, Carbide has maintained that long-term health effects and the incidental damage caused had been exaggerated.

It was perhaps against this background that Mr. Holman said that he was not very optimistic of the settlement coming about in the next few days. When asked if he would ask for an extension of the time given by the court, he said that the American and Indian lawyers representing the company had not decided as yet and he was not aware of what the Government planned either. Another Carbide source, however, said that while the process was on, for every ten steps taken forward, there were five steps back. An agency report which quoting the **New York Times** had said that the two parties had made progress on reaching an out-of-court settlement, was not quite correct, according to him. The fact that the Government of India was willing to look into the possibilities of settling the matter out of court was a positive and constructive development as far as the U.S. company was concerned, but it could not be said that they were nearing a settlement, he said.

Indian finding on Halley interesting

Several interesting observations throwing new light on Halley's comet have been recorded by Indian astronomers during the celestial visitor's 1985-86 rendezvous with the solar system.

These observations have led to new findings on the comet's atmosphere, the evolution of the molecular species within the coma or the head and the interaction of the ions in the tail with the solar wind.

These discoveries by various research missions under the Indian Halley Observation Programme (IHOP) were presented at the National symposium on Halley's comet at the Indian Institute of Astrophysics (IIA) in Bangalore.

Observations at the Kavalur observing station, of the Vainu Bappu observatory of the IIA, have revealed that molecules like carbon, carbon monoxide, carbon dioxide and cyanide that are released from the comet's nucleus are not uniformly distributed as believed earlier.

These observations have brought out, for the first time, the asymmetric distribution of the molecules in different directons within the coma.

The IIA's scientists have determined for the first time the life-span of these molecules and of the parent molecules like hydrocyanic acid, cyanine and methane. Till now, the scientists had values which were based on theoretical calculations.

Continuous monitoring of the spectrum of Halley's comet from the Uttar Pradesh state observatory, Nainital, has provided valuable information on the evolution of the molecular species within the coma. While the Osmania University's spectra and photometric observations revealed bursts of gas and dust from the comet during the apparition, those by the physical research laboratory, Ahmedabad, were able to show the speed with which the molecules were released from the nucleus into the coma of the comet.

These observations revealed that the velocity of ejection was not uniform but changed from place to place, the average being about 3 kms a second. — The IIA's scientists have recorded a very interesting phenomenon in the comet's tail. Photographs, taken by the Schmidt telescope at the Kavalur observatory, showed that a disconnection of a part of the tail, twists and waves travelling down the tail occurred.

The organisations that participated in the IHOP include the IIA, the astronomy department of Osmania University, the physical research laboratory, Ahmedabad, positional astronomy centre, Calcutta and the Nainital observatory. Prof. K. R. Sivaraman of the IIA, who headed the programme, is the only Indian astronomer on the International Halley watch.

The IHOP was funded jointly by the department of science and technology and the Indian Space Research Organisation (ISRO).

GROWTH IN EXPORTS OF LEATHER PRODUCTS

The Chairman, Council for Leather Exports, Mr. M. Mohammed Hashim, told the council annual general meeting in Madras recently that during the current year exports would exceed Rs. 1100 crores mark of which 60 per cent would be of value added leather products. He said leather garments and leather footwear sectors had registered phenomenal growth during 1986-87.

The United States, Soviet Union, West Germany, France, U.K. and of late Japan were the main countries to which leather products were exported. He forecast a good demand for leather products during the current year. He, however, cautioned that continued success on this front would be possible only if there was sufficient improvement in quality. A vigilant check should be kept on rising prices so that leather products remained not only attractive to buyers but competitive in prices, he said.

The CLE has been assisting the industry in its modernisation efforts. The council is inviting experts from abroad to provide designs to the leather garment/footwear sector. In the past three years, the council had organised foreign training visits to 62 persons in tanning and finishing and 31 in footwear and leather goods.

ONGC to increase crude oil output

The Oil and Natural Gas Commission (ONGC) has planned to increase crude output by four million tonnes in the next two years in a major effort to cut down on imports and save valuable foreign exchange.

This additional production to be achieved from some of the new wells in fields in the western coast and southern coast will help save foreign exchange to the tune of Rs. 730 crore, the ONGC sources said.

Increased production from oil fields in Assam and Bombay high will also be part of this strategy outlined in the Seventh plan, the sources added.

Crude oil production in the country in 1986-87 was of the order of 30.48 million tonnes, well over the target of 27.8 million tonnes. Production target for 1987-88 is fixed at 27.62 million tonnes and in the first six months of the current financial year, more than 50 per cent of it has been achieved. Production has been nearly 14 million tonnes.

The ONGC has a short term and long term strategy to achieve this production increase in the next two years. Under a short term strategy, it proposes to maximise recovery with improvements in recycle speeds and workover index.

It is estimated that even a one per cent increase in recovery from the existing reservoir can give an additional 30.5 million tonnes of recoverable reserves.

Special thrust is also being given to workover operations, consequently enhancing output from the wells. This is all the more significant as the number of producing wells have multiplied several times from a level of 1,700 in 1980 to over 3,000 as of now.

The ONGC sources pointed out that as many as 66 discoveries of oil and gas had been made since the beginning of the Sixth plan and 20 of these discoveries had already been put on the early production system (EPS).

The EPS is a new concept in forward planning in international oil exploration, where wells with potential are put on early production, to cut short long gestation period.

Offshore exploratory development wells have been drilled in the east and west coast. Sixteen wells have yielded significant oil discoveries. Oil and gas has been found in 31 offshore structures since April 1980, excluding Bombay High, the sources said.

Some of the new discoveries in the west coast, especially those lying in the south Bassein field. are to be put on production through the floating production system.

Besides, a long term 20 year perspective plan has also been drawn up to increase production substantially, the sources said.

HBJ PIPELINE PHASE 1 WORKING WELL

The first phase of the HBJ pipeline, inaugurated in August this year, is functioning well and over 12 million cubic metres of gas valued at over Rs. 2.7 crore has been supplied to the Bijaipur fertiliser plant of the National Fertilisers.

Giving the information to the Consultative Committee meeting of MPs attached to his Ministry, Petroleum Minister Brahm Dutt said work was in progress in the Bijaipur-Auraiya section. The pipeline to Aonla and Jagdishpur was expected to be completed well in time to meet the requirements of the two fertiliser plants proposed in these areas.

The Minister referred to the recent oil find in the Bhuvanagiri No. 1 well in the Ariyalur Pondicherry sub-basin of the Cauvery and said the ONGC well yielded oil at the rate of 206 barrels per day.

Dutt said the significant discoveries of oil in the Cauvery and Krishna-Godavari basin and in the Western Coast had given new dimension to oil and gas potential in these areas.

Gas found off Daman

While the ONGC had discovered gas from two wells in the coastal town of Daman in the western coast, Oil India had opened a new prospective area in Arunachal Pradesh for future exploration. They had found substantial quantity of oil in the well identified as Kumchai 2.

Making a particular mention of the Oil Industry's role in the present drought situation, Dutt said the demand for petroleum products in the affected States were being met. As much as three lakh tonnes of High Speed Diesel oil (HSD) had been released to States in the north-west in August this year against 2.20 lakh tonnes released in August last year.

Dutt assured members that the peak requirement of HSD in the coming winter season would be met. No shortage of petroleum products will be allowed to develop in any part of the country, he added.

The oil industry was building up stocks in the north-western region for this purpose, he told the MPs.

He said no shortage of petroleum products was allowed to develop in any part of the country, as a constant monitoring was being done to ensure that the requirements of consumers were fully met.

The minister said the oil industry had met the requirements of petroleum products in the drought-affected States, particularly in Gujarat and North-West.

BAYER INDIA SETS UP INCINERATION PLANT

Bayer India has set up an incineration plant at its Thane factory at a cost of Rs. 1.7 crores. This is stated to be the first of its kind in India. Its capability to incinerate all kinds of complex chemical waste — solid, liquid and gaseous — makes it unique in characteristic and distinct from regular incinerators.

This is a second major step in the field of environmental protection by the company, complementing with its earlier Rs. 1.5 crore biological waste water treatment project commissioned in 1981. With these projects, the company will comply with the standards set by the Maharashtra Pollution Control Board. The technology transfer has been from Bayer AG (West Germany) and Sulzer Ghelfi Products from Switzerland. The design and construction have, however, been done indigenously by Thermex Pvt. Ltd., Pune.

The incineration plant has a capacity to burn 6 tonnes of waste every 24 hours with full safety. Besides, the plant will produce surplus steam which will be used in the company's manufacturing plant

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Small units with foreign equity may get SSI status

The Union Government is examining a proposal that seeks to confer the status of small-scale industry (SSI) on small units having foreign equity participation.

At present, small units having foreign equity participation are not allowed to be registered as SSI and hence cannot enjoy the fiscal and non-fiscal facilities extended to this sector.

The proposal is now before the office of the Development Commissioner for Small-Scale Industries (DCSSI), which held detailed discussion on this issue at the recently organised meeting of its standing committee on policies, programmes and raw materials for small-scale industries.

What has prompted the office of DCSSI to undertake an examination of this proposal is the receipt of several memoranda from various State Governments and other agencies connected with SSIs. These memoranda have sought clarification if small-scale units having foreign equity participation could be registered as SSIs.

The office of DCSSI has already sought the views of the Industry Ministry on this matter. The licensing policy division of the Ministry has stated that companies having foreign equity participation of less than 40 per cent of the total issued capital of the company are not treated as foreign companies and are eligible for exemptions from industrial licensing if other conditions are satisfied. Hence "foreign participation of less than 40 per cent in equity does not debar a unit from being treated as a small-scale unit."

Evidently, the size of the foreign company which participates in the equity of a small-scale unit will not be taken into account because the concept of large, medium and small industries varies from country to country. But the extent of foreign equity in the small-scale unit has to be limited to 40 per cent to enable it qualify as an Indian company and hence enjoy the benefits.

The DCSSI office has also prepared a note detailing therein the reasons for which SSIs should be allowed to have foreign equity participation and the doubts that should be resolved if such permission is granted by the Government.

In this context, the DCSSI office has argued that permitting foreign equity participation in small-scale units will help small industry modernise fast with necessary imports of the latest technology without causing much foreign exchange availability problems. It is pointed out that modernising small industry will require import of technology, machine drawings and designs entailing foreign exchange outflow.

This outflow could be adequately neutralised if foreign equity is allowed in small units. The foreign exchange funds made available through such equity participation could be used for financing technology imports. Such imports are considered essential for modernising industry to help it meet stiff internal as well as international competition for the home and export markets.

However, while allowing foreign equity participation to the tune of 40 per cent, the basic criteria of small units like maximum investment limits of Rs. 35 lakhs in respect of small units and Rs. 45 lakhs in respect of small ancillaries have to be maintained. These investment limits should also take into account the landed cost of foreign machinery procured out of the foreign equity. In short, the foreign equity participation should not affect the existing definition of small and ancillary units.

The doubts which the DCSSI office wants to resolve pertain to the status of the foreign company participating in the equity of the small unit and the extension of the same principle to the participation of large Indian companies in small units. The present policy stipulates that no unit having linkages with a medium or large unit can get registration as a small unit.

Similarly, neither a unit owned or controlled by a large company nor a subsidiary of a large company is treated as a small-scale unit and given registration as such. The DCSSI office has argued that once foreign equity in small units is accepted, the question of the status of the foreign company surfaces.

A foreign investor is likely to have some control over the small unit by way of management or otherwise. If the foreign company's control is accepted, the question arises as to why the organised sector within the country should not be treated on par and, if treated on par, the small-scale sector faces a big threat as all the facilities available will be taken by the organised sector units in the guise of small-scale units.

This doubt is yet to be resolved. Some more rounds of discussion within the Industry Ministry are expected to take place to resolve these doubts and take a final view of this proposal.

ATLANTIC POLLUTED WITH PLASTIC WASTE

The North Atlantic Ocean is becoming increasingly polluted as the plastics that wash up on shorelines and beaches amount to three times more than 15 years ago, researchers say.

A report in the Journal of the Woods Hole Oceanographic Institution, said most of the plastic garbage, including bags, cups and disposable containers, is probably dumped by commercial ships operating offshore.

However, much of the plastic pollution is comprised of tiny pellets of polyethylene, called nibs, that are the raw material from which plastic goods are manufactured.

Handled like grain, the nibs apparently spill into the ocean from coastal manufacturing and shipping sites, according to researcher Mr. R. Jude Wilber, who wrote the report.

Mr. Wilber, a staff scientist at the Sea Education Association, said beaches from Cape Cod to the Bahamas have been littered with the tiny plastic pellets.

He said fish can be killed or harmed by eating nibs and said larger pieces of plastic have been known to strangle birds and seals.

GUJARAT FIRM SHUT AFTER GAS LEAK

District authorities ordered the closure of an industrial unit at Panelaw, some 46 km. from Baroda, following chlorine gas leakage on October 25 which affected 25 people.

Panchamahals district officials said that the unit would not be allowed to reopen till it had obtained clearance from the state pollution control board and other authorities.

Long-term energy plan on anvil

The Planning Commission has initiated an exercise to draw up a long-term energy plan with the help of different models projecting the demand and availability position over a period covering upto 2004-2005.

Disclosing this in New Delhi on Oct. 27, minister for planning P. Shiv Shanker told a meeting of the parliamentary consultative committee attached to his ministry that this has been necessitated by the fact that the total energy requirement is estimated to increase by about three times from 741 million tonnes of coal replacement in 1984-85 to about 2,046 million tonnes of coal replacement in 2004-2005.

He said that the share of commercial energy in the total system is expected to increase from 58 per cent in 1984-85 to 80 per cent in 2004-2005. And within the commercial energy segment, the share of electricity is expected to rise from the level of 31 per cent in 1984-85 to over 39 per cent by 2004-2005. The share of coal and oil, however, is expected to go down, he added.

Mr. Shiv Shanker said that in spite of these large increases in the availability of various forms of commercial energy, India is faced with shortages While the demand for non-coking coal has largely been met from indigenous production, import of some amount of high quality coking coal for steel production has been considered necessary.

He said, while the Seventh Plan target for an addition of 22,245 mw generating capacity is expected to be exceeded, some shortfall is apprehended in the generation target of energy set at 280.4 billion units due to bad performance of some thermal generating stations and shortfall in hydro power generation following lower reservoir levels.

Mr. Shiv Shanker said India's dependence on imported oil is expected to go up unless major new oil discoveries are made. The percentage of demand for petroleum products met from indigenous sources is expected to be reduced to 61 per cent in 1989-90 from 69 per cent in 1984-85.

He said natural gas is now emerging as a major hydro-carbon source of energy which would partly replace the use of oil. There has been considerable increase in the production of natural gas from 1.4 billion cubic metres in 1970-71 to 9.8 billion cubic metres in 1986-87 and is anticipated to go up to a level of 14.9 billion cubic metres in 1989-90.

The minister said that the supply of various forms of energy has increased manifold since the beginning of the First Five Year Plan. The production of coal has increased from about 35 million tonnes in 1950-51 to 165.8 million tonnes in 1986-87, electricity generation from the utilities had gone up from 5.1 billion units in 1950-51 to 187.6 billion units in 1986-87 while the installed capacity has increased from 1,713 mw to 49,288 mw during this period. Oil production has gone up from 0.26 million tonnes in 1950-51 to 30.5 million tonnes in 1986-87.

The energy sector is perhaps the most important one in terms of plan outlay as well as basic infrastructure support to all other sectors of the economy. About one-third of the Seventh Plan outlay has been allocated to this sector which includes commercial energy such as coal, oil and power and non-commercial as well as renewable energy such as biogas, solar, wind etc.

The MPs by and large appreciated the measures taken by the government to step up the availability of conventional sources of energy but laid stress on utilising non-conventional sources in a bigger manner.

They expressed concern about the shortage of electric power in vital sectors like agriculture. Some members suggested that big industrial houses be asked to instal their own captive generating plants so that the needs of the agricultural sector could be met to a large extent.

While pleading for an early clearance of various proposals in respect of power projects, the members suggested that the working of the state electricity boards should be improved and their losses minimised so that power generation could be augmented suitably.

MODIS MAY GET APPROVAL FOR FIBRE PROJECT

The Modis are finally going to get the official nod for their viscose fibre project. A special meeting of the Projects Approval Board (PAB) has been convened next month to consider take a decision on the revised Modis' proposal to set up a viscose fibre project, it is learnt from competent sources.

At the last PAB meeting in May, a decision was taken that Modi Fibres Ltd, which is the promoter of the Rs. 119 crore project at Ratnagiri in Maharashtra, should be asked to float global tenders seeking the latest viscose fibre making technology. The Modis have, however, produced a certificate from Marubeni of Japan to the effect that the technology and plant and machinery that they are going to get from their collaborator Courtaulds of the UK are the best available in the world.

The Modis are tenaciously pursuing this project since the beginning of 1985 when it submitted the composite application for government clearances. The original proposal related to the import of a whole set of plant and machinery lying idle at Greenfield in the UK from Coutaulds at a price of £13 million.

The strong point of the Modi project is that Courtaulds, Commonwealth Development Corporation and International Finance Corporation have agreed to participate in the equity capital of Modi Fibres. The UK collaborator is also to buy back a portion o the production of viscose fibre by th Modi company.

PERSONALITIES

S. VISWANATHAN

Mr. S. Viswanathan has taken ove as general manager (technical) c Bharat Petroleum Corporation Limite (Refinery).

RAMU S. DEORA

Mr. Ramu S. Deora has been appointed chairman of the export-impor advisory committee (western zone) Bombay, of the Federation of India Export Organisations.

DR. B. G. KHARE

Dr. B. G. Khare has taken over a Director (Commercial) in Governme of India owned company Hindusta Organic Chemicals Ltd., Rasayani, di trict Raigad. Prior to joining HOC H worked in Shriram Fertilizers and Ch micals as Divisional Sales Manage Dr. Khare commenced his services HOC in 1979 and held key positio of Chief Marketing Manager and G neral Manager. He has introduced ne commercial concepts which has hel ed the company in its sustained prof

PRICE CONTROL

Drug units seek margin

A number of drug units may not implement the new prices for drug formulations in Category I and II under the Drug Price Control Order, (DPCO), 1987 unless the issue of trade margins is sorted out, it is learnt.

The government has reportedly decided to revise the prices of essential drug formulations on the basis of new mark-ups of 75 per cent for Category I formulations and 100 per cent for Category II formulations.

It has also taken a stand that the ssue of trade margins is a matter to be settled by the industry and trade hemselves. According to informed sources, revision of formulations prices for Category I and II in this context would mean losses in the case of many companies as it would imply implementation of new trade margins of 18 per cent and 20 per cent.

Under the new DPCO, quite a few drug companies will get a lower mark-up with shifting of certain items to new Category I and II from the Category III decontrolled list of DPCO, 979.

For instance, the mark-up of rifampicin formulations will be only 75 per cent under the new DPCO whereas it was 100 per cent in the DPCO, 979. In the case of quite a few formulations used for the treatment of blindness also there will be a sharp reduction in the mark-up under the ew DPCO.

A large number of formulations which are presently listed in Category II of the new DPCO were actually hifted from Category III of the 1979 DPCO. There will, therefore, be no hange in the mark-up of these formulations.

Formulations in Category II of the 987 DPCO are entitled for a mark-up of 100 per cent as was the case ith the formulations in Category III of the 1979 DPCO.

With no change in the mark-up in e case of some formulations and ith a reduction in the mark-up in e case of a few other formulations e drug units would be at a great dis-ivantage if they implement the new ices, the sources point out.

That would only mean a further re-ction in the profit margins by way of additional trade margins. Drug units have been paying a trade margin of six per cent to wholesalers under the old DPCO although the officially fixed wholesalers' margin was only two per cent.

On the contrary the drug units would be under pressure to hike the wholesalers' margin to a level of at east seven per cent as the government has already hiked the retailers' margin by 50 per cent in the new DPCO.

The government has hiked the retailers' margin to 17 per cent from 12 per cent in the case of ethical drugs and to 15 per cent from 10 per cent in the case of non-ethical drugs in the new DPCO.

As it will not be possible to reduce the government-fixed margins for retailers, and also the currently paid wholesalers' margin of six per cent, the drug companies would have to pay a total trade margin of 21 per cent in the case of non-ethical drugs and 23 per cent in the case of ethical drugs.

Book on case histories

With the rapid industrialization of India has come a quantum jump in the number of chemical, fertilizer, petroleum and petrochemical industries, and thermal and nuclear power plants. Even though many of the plants have had reputed foreign collaborators and, besides the process know-how, often some of the plant equipment has also been imported, yet almost all such plants have faced numerous operational problems. Each plant has had to discover for itself the specific operation schedule at an exhorbitant cost of time and sleepless nights and production losses.

Since the pace of industrialization is only going to increase with gas based plants and other chemical plants, it has been strongly suggested that industries avoid repeating the mistakes already made, or design defects already discovered during plant operation by others. While each industry has equipment specific to its needs, experience has shown that heat transfer equipment are used in one and all. Specifically, these are heat exchangers, coolers, condensers, surface condensers, reboilers, boilers, dryers, evaporators, etc.

It is planned to collect case histories of problems encountered in design and operation of these units. The book will also consider problems related to pumps and compressors, pipelines, furnaces, distillation columns, strippers, absorbers, storage tanks, etc. These will be collated, put in a uniform pattern with figures, etc. Names and organizations of the contributors will also be published so that the expected world-wide readers can correspond with them further, unless the contributors and/or their organizations wish to remain annonymous.

Case histories may be related to codes and standards, design, operation, material selection, welding, fabrication, installation, repair, maintenance, vibration, erosion, corrosion, rupture, explosion, supports settling, damage by earthquake, fouling, cracks in tubesheets, plugging of tubes, tubesheet bending, problems in alternate use of an existing unit, transport, storage, start-up, shutdown, emergency and upset conditions, stacked units, standby units, fogging in condensers, air leakage in surface condensers, vacuum systems for evaporator train, tube-to-tube sheat joints, leakage past longitudinal baffle, thermal and physical properties instrumentation and control, air/water/soil pollution, waste treatment etc.

Those interested in contributing to the book are requested to contact : Mr. J. P. Gupta, C/o. Dept. of Chemical Engineering, Indian Institute of Technology, Kanpur-208 016.

ONGC DRILLING BEGINS OFF COCHIN

The Oil and Natural Gas Commission (ONGC) has begun exploratory drilling in the Arabian sea, 70 km off Cochin.

According to ONGC sources, a foreign rig on hire is engaged in the drilling of the first well to a depth of 4,200 metres

UNINTENDED PROFITS OF DRUG COMPANIES

Govt. to recover 150 crore

The government has decided to proceed with the recovery of unintended profits estimated at about Rs. 150 crores from drug companies despite stiff resistance from the industry, reports Sushma Ramachandran in **The Economic Times**.

A four-member committee, which was set up to finalise the modalities of mopping up the unintended profits, has concluded a series of visits of concerned drug units. Steps will now be taken, on the basis of its recommendations, to recover the huge amounts due to the government.

Drug companies have maintained that such action will lead to serious financial losses. But the government is of the firm view that, with the new liberalised drugs policy, these units are in a position to recoup any such losses.

It has, therefore, been decided to proceed on a case-by-case basis and recover the unintended profits which will accrue to the drug price equalisation account (DPEA), as expeditiously as possible.

Official circles at New Delhi point out that it is no longer possible for the drug industry to resist from paying these dues, since the new Drug Price Control Order provides ample scope for producing drugs at remunerative prices. In the past, the companies had contended that price controls were forcing them to sell drugs at uneconomic costs and their overall profitability had declined. In the changed situation, it is felt, the drugs industry cannot continue to argue in this manner since price controls have been lifted except on a relatively small basket of essential drugs covered under categories I and II of the new DPCO.

In addition, the government is of the view that the drugs industry cannot absolve itself of the responsibility of having overcharged consumers in the sale of essential drugs in the past. Consumers organisations have also stressed this aspect in numerous discussions over the new drugs policy.

The stage had been set for the recovery of unintended profits from the drug companies earlier this year when the Supreme Court had up-held the principles governing price fixation in respect of 11 drug companies and set aside the orders of the Delhi high court. In its judgement, the Supreme Court had also directed the government, to give a hearing to the concerned companies in respect of their revision applications and thereafter, to announce the prices of the concerned drugs.

The government had given hearings to all drug companies within a stipulated time and refixed the prices of these drugs at the same levels at which they had been fixed in 1981, and the companies directed to charge according to them and to deposit the difference between their own and government fixed prices for the entire period.

The concerned drug companies had also given an undertaking before the Delhi high court to the effect that they would deposit the entire amount of difference in the event of their petition being dismissed by the court. The Supreme Court had held in its judgement that this undertaking still subsists.

Therefore, the government, in addition to giving notices to the companies to deposit the amount under the Essential Commodities Act, moved the Supreme Court for issuing directions to the concerned companies to deposit the amount in terms of the undertaking which they gave before the high court.

As far as the drug price equalisation amount is concerned, it was clarified at the time of announcing the new drugs policy in August that a special provision had been incorporated in the new DPCO in order to protect the amounts which had already accrued or which shall accrue as a result of prior action, to the DPEA.

In other words, it was stated, whatever unintended profits had been made in the past would be recovered by the government and credited to this account. The minister of state for chemicals and petrochemicals, Mr. R. K. Jaichandra Singh had specifically mentioned that in future also the government had the right to recover any excess amount charged by companies over the government-fixed prices. Such amounts would be credited to the government account, he said.

Under the new DPCO, however, th retention and pool price mechanism operating through the DPEA had been withdrawn. This was done because experience showed that the system was not serving the objective adequately, which was to protect the interests o indigenous manufacturers. On the other hand, it was giving rise to a number of intractable administrative problems as also avoidable litigation. It was thus decided in the new measures to provide protection to indigenous manufacturers through the use of tariff mechanism wherever necessary.

ST EXEMPTION FOR PASTEUR INSTITUTE'S VACCINES

Vaccines produced by the Pasteur Institute, Coonoor, Nilgiris, have been exempted from sales taxes, both state and Central, by the Tamil Nadu government.

The 80-year old institute makes anti-rabies vaccine; diphtheria, pertussis, tetanus vaccine or triple antigen; diphtheria combined tetanus vaccine, and, tetanus toxoid. The eight per cent state sales tax will no longer by levied, according to Notifications I & II.

The triple antigen costs 55 paise while the tetanus toxoid 25 paise. Prices have not risen since three years, despite escalation of costs of raw materials, increase in wages and other inputs. The exemption would make the vaccines cheaper. The institute produces the DT, DTP and TT vaccines used in the national immunisation programme to protect children from the seven major killer diseases, namely, diphtheria, tetanus, pertussis, polio, measles, typhoid and tuberculosis. Its performance is considered the best among the 12 institutions in the country, both in the private and public sectors, in the production of prophylactic vaccines. They are also the cheapest in the country.

Vaccines produced by the Institute are allocated on the basis of targets fixed and sent to the states, and the production itself has to be planned at least a year in advance on the basis of the demand projections, as the vaccines require four to eight months to process.

The institute was taken over by th Centre in 1977. Till then it was ru by donations from the public, and sales proceeds of its vaccines.

ESSENTIAL DRUGS :

government fix to prices soon

The prices of 149 essential drugs of mass consumption in category I and II of the new Drug Price Control Order (DPCO) will be fixed shortly, it is learnt.

The government has decided to fix these prices unilaterally since the industry and trade which had expressed serious reservations on trade margins and other issues, have so far not come forward with their views to the government.

The category I list consists of 27 drugs used in the national health programmes, except for seras and vaccines. They include anti TB and anti-leprosy drugs, oral rehydration salts and drugs needed for malaria and filaria eradication programmes. The category II list covers another 139 drugs being brought under price control. These include a wide range of antibiotics, vitamins and other important drugs.

The new DPCO was announced about two months ago, and since then the trade and industry displayed indifference to the government's anxiety to fix prices of essential drugs. The government, on the other hand, has been keen to resolve all issues without any further delay so that drugs production can be raised to match the growing demand.

Vested interests in the drug industry however, appear to be so strong that nothing can happen in the normal course. This has been evident from the delay in formulation of the revised drug policy. At every stage interested lobbies were at work.

Exasperated by the continued wrangling even now, the government felt there was no point in waiting for applications from industry on price fixation. If drug companies were really interested, they would have responded by now.

Official sources believe that after the announcement of the new prices, market availability of these drugs will improve considerably. Any shortfall in production in the private sector will be made good by higher production from the public sector, these sources assert.

Mercifully, the public sector drug units are now performing a shade better than previously. This is mainly due to financial assistance from the Central government and tight monitoring of production and marketing by the management of these units.

The Indian Drugs and Pharmaceuticals Limited and Hindustan Antibiotics as well as other public sector units have, in fact, been summoned to step up their production so as to make essential drugs available to the public at prices fixed by the government.

The government is determined to ensure that not only are all essential drugs available in the market but that there is no black-marketing at all. Drug controllers in different states have been requested to maintain vigilance on this score. Sources point out that government will not hesitate to import any essential drugs which are not being made available by domestic producers.

Under the revised DPCO, every drug company is required to make a specific application for price revision on the basis of changed MAPE (maximum allowable post-manufacturing expense) in respect of controlled drugs. Although the DPCO was to come into force with immediate effect, it had been clarified that price changes would not be automatic.

But the industry and trade have not been able to reach any agreement on the issue of the revised trade margins. The new DPCO stipulates that wholesalers margins on ethical and nonethical drugs be raised uniformly from two per cent to three per cent. Retailers margins on ethical drugs have been fixed at 17 per cent and non-ethical drugs at 15 per cent.

Earlier, the wholesalers were being given 2 per cent officially and retailers had a margin of 12 and 10 per cent respectively for ethical and non-ethical drugs. Unofficially, however, the whole salers were being given a margin of 6 per cent and retailers about 10 to 12 per cent.

Thus, in effect, the new DPCO slashed the margins of wholesalers by three per cent. Discussions between the retail trade wholesalers and the drugs industry failed to arrive at any satisfactory conclusion. And the government has decided to abstain from and stand on this issue, apart from stipulating that the overall margins should be 18 per cent for non-ethical drugs and 20 per cent for ethical drugs.

In view of the continued stalemate the government had no option but to unilaterally revise prices of most drugs coming under categories I and II. Any further delay, it is felt, might have led to shortages of these drugs in the market.

CENTRE URGED TO CHANGE DRUG POLICY

The Left Front government of West Bengal urged the Centre to change its drug policy which was not only "anti-people" but gave a "free rein" to multinational companies.

Speaking at a state convention of the all-India Chemical and Pharmaceutical Employees' Federation (AICAPEF), the health minister, Mr. Prasanta Sur, and finance minister, Dr. Ashim Dasgupta, said the Centre's policy, formulated in 1986, not only "threatened" the growth of public sector pharmaceutical units but "helped" the MNCs to earn huge profits at the cost of the people.

The two ministers said the MNCs were being allowed to manufacture and import medicines and sell them at a price three to four times higher than they would cost in Western countries whereas the same could be produced by "our public sector units and sold at a much cheaper rate."

Mr. Sur said the "fight against Centre's drug policy should not be carried out in isolation from other issues. It's a part of our wider struggle against the Centre's industrial, economic and other policies."

METHANOL PROJECT GETTING READY

The Rs. 34 crores methanol expansion project of the Assam Petrochemicals Ltd, (APL), a government of Assam undertaking with a 100 TPD capacity is expected to be commissioned in February 7, 1988. The delay in commissioning of the project by ten months from its earlier scheduled date of April 1987 is attributable according to APL sources to the "irrational and arbitrary" power tariff hike by the Assam Electricity Board (ASEB) from 55 paise to 110 paise per unit for industrial use.

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Case against energy subsidies

Many developing countries are discouraging development through efficiency-thwarting energy subsidies and some oil exporters are among the worst offenders, a new study argues.

'Quite simply, countries that do not subsidise energy, use it more efficiently than those that do and therefore they are less susceptible to energy price shocks', said the economist, Mr. Mark Kosmo, in the study published by the World Resources Institute.

The institute is a Washington-based environmental policy research organisation supported by foundation grants. It has produced several reports in recent years on how economic policy can help protect the environment.

Though countries sometimes justify energy subsidies as necessary to hold down inflation, protect the poor, or encourage industry, these results are in fact rare, the study argued.

'Egypt's situation illustrates what is perhaps the most important finding of this study: Petroleum subsidies are so large in several oil-exporting developing countries that they lead to significant economic and fiscal losses — losses that make the hard times brought on by recent declines in world oil prices harder', Mr. Kosmo wrote.

'In Mexico, Nigeria, Ecuador, Venezuela, Peru and Egypt, debt problems can be mitigated by increases in domestic energy prices. If price controls were eliminated and subsidies reduced, more oil could be exported. Every subsidised barrel consumed represents foregone foreign exchange earnings.'

In Egypt, energy prices are about 20 per cent of world prices and a gallon of gasoline costs about 50 cents.

Practically, no country charges enough for electricity, even industrial countries like the US Mr. Kosmo argued — 'enough' defined as rates high enough to pay for the generation of the last kilowatt-hours and to replace the investment in plant and equipment when it wears out. This is what economists call long-run marginal costs.

India subsidises electric rates in rural areas, charging close to long-run marginal cost for industrial customers but only 20 per cent of that ideal rate for agricultural users in a subsidy that one analyst estimated at $4 billion a year.

Three-quarters of the agricultural subsidy goes to four million owners of irrigation pumps, 'comparatively affluent farmers', the study said.

Since high demand makes electricity supply unreliable, many farmers maintain back-up diesel pumps at an estimated aggregate cost of $320 million a year.

Though diesel fuel is often subsidised on the grounds that it benefits public transportation used by the poor, what happens is that affluent auto owners switch to diesel engines, the study said.

Though the world prices of gasoline and diesel fuel are similar, Indonesia and India hold diesel fuel prices at 50 per cent of gasoline.

CALL TO SET UP GAS-BASED TURBINE PLANTS

The country should go in for gas-based turbine plants in view of the abundant reserves of natural gas to meet its power requirements, the Secretary to the Department of Public Enterprises, Mr. V. K. Dar, said.

Inaugurating a seminar in New Delhi on gas-turbines organised by the Bharat Heavy Electricals Ltd. and its collaborator, the US-based General Electric, Mr. Dar said such power plants had a short gestation period. The country's reserves of natural gas were estimated at 7600 billion cubic metres.

Thermal efficiency of gas-based power stations was about 45 per cent compared to 35 per cent for steam-based power units. Combined cycle power plants using gas turbines had high reliability and availability besides being pollution-free, he added.

The BHEL Chairman and Managing Director, Mr. B. S. Samat, said the company had undertaken phased manufacture of gas turbines at its Hyderabad plant.

Its gas turbine testing plant was nearing completion he said adding that the unit sizes of turbines had been selected to suit the needs of the Indian projects.

About 200 high officials, technocrats and engineers from various Government offices and undertakings and State electricity boards and industries participated in the seminar.

ILO INVENTORY ON HAZARDOUS CHEMICALS USE

The International Labour Organisation (ILO) is preparing an inventory of hazardous chemicals in India so that disasters resulting from these chemicals could be prevented, the ILO Director, Mr. Sunil Guha, said in Bangalore.,

Participating in the inaugural session of the "National programme fo executives of employers' association" he said ILO, wtih the help of Wes Germany, had sponsored a hazard control alert system which would be introduced in ten States in India. The programme would be in full swing next year.

He said ILO had identified three industries in India which employed chil labour extensively. A survey was underway and a consortium had been se up by ILO to fight child labour exploitation.

Mr. Guha said ILO had supporte a project on "all India consultation on rural development" which aime at bringing together representatives o trade unions and grassroot organisations for improving the socio-econom conditions of the unorganised worke in the rural areas.

IPCL SALES PACT WITH ACC

Indian Petrochemicals Corporati Ltd. (IPCL) has signed a sale agre ment with the Associated Ceme Companies Ltd. (ACC) in Bombay r cently to acquire the catalyst and a sorbent unit of the latter located Thane in Maharashtra.

The acquisition will provide a stro base to IPCL to develop newer ca lysts required for refineries and p rochemicals plants in the country. will also cater to the growing requi ments of speciality absorbents, mo cular sieves etc., according to a pre release issued by the company.

Facilities for research in plastic engineering

The Central Institute for Plastic Engineering Technology at Madras (CIPET) has been recognised for conducting research in plastic engineering and polymer sciences. At present, it is a premier institute in the field of plastic processing technology training, consultancy and development of plastic applications.

With the proposed coming up of petro-chemical units in Uttar Pradesh, Tamil Nadu, Maharashtra, West Bengal, Gujarat, Andhra Pradesh and Karnataka, the CIPET has also expanded its activities through setting up of extension centres in different parts of the country so that regional imbalance in the growth of plastics conversion industry could be minimised and all the states in the country can be benefited by setting up new plastics units.

For providing training facilities, five new centres in various parts of the country have been established; the extension centres at Hyderabad will provide specialisation in engineering plastic, at Ahmedabad plastic processing technology and equipment development, at Lucknow in electronic, telecommunication and automation, at Bhubneshwar in housing and at Manipur in water management. The minister of state for chemicals & petrochemicals Mr. R. K. Jaichandra Singh, is personally visiting these centres to ensure that necessary training facilities were developed. With the setting up of one petrochemical complex, there was scope for five-fold increase in the downstream units.

The other purpose of the CIPET is to provide training for entrepreneurship, and also helping industry in producing quality material. At present, due to non-availability of skilled manpower, the institute has introduced short-term and special courses for providing skill. The government has also introduced the "operators' course" in various industrial training institutes so that this industry is supported with adequate skilled manpower.

CIPET has established a plastics testing centre at Madras, which is equipped with highly sophisticated equipments like rheometrics dynamic spectrometer (RDS), fourier transform infrared spectrometer (FTIR), high performance liquid chromatograph (HPLC). It undertakes developmental projects from industry and also carries out investigative work for solving the problems of plastics industry.

CIPET is also assisting the industry by undertaking design and development of moulds and dies, which is especially important in indigenisation of imported plastics components.

Plastics processing industry in India is predominantly in the small scale sector and there are about 10,000 units consuming almost 500,000 tonnes per annum of raw materials. Most of the processing machines for these units are indigenously made and the machinery manufacturing facilities are also in the small scale sector.

IPA PLEA FOR CONCESSIONS

The withdrawal of special concessions to the small-scale industry (SSI) through Union Government Notification No. 19/87 and 223/87 would hit the paint industry in the small sector, according to Mr. S. Subberwal, Presidents Indian Paint Association (IPA).

Mr. Subberwal while addressing newsmen in Calcutta said that about 30 to 40 per cent of the paint manufacturers in the small sector are expected to close down their units.

The Government Notification No. 190/87 sought to nullify the special concession that the users of the small-scale were getting in the form of full set off, even though concessional duty was paid by the small sector. Under this scheme if the basic price was Rs. 100 and the SSI manufacturer paid a duty of 10 per cent, the user industry would get a set off of 20 per cent. This automatically gave a price preference to the small units, Mr. Subberwal said.

With the withdrawal of this concession the large user industry would prefer to buy their paints from the larger companies, Mr. Subberwal felt.

The Notification No. 223/87 sought to break the trade between the small and large units in the paint industry.

The large-scale sector will now find a cost disadvantage in rendering assistance to the small sector and will prefer to manufacture all their products by themselves. Till now the low technology items such as cement paints, primers etc. were given to the small units by the larger companies.

Mr. Subberwal said that the assistances from the large-scale companies made a number of small units viable and could carry on their branded sale as their overheads and costs were covered through marketing by large-scale.

The IPA President urged the Government to immediately withdraw these notifications. A representation has been made to the Ministries of Commerce and Industries regarding this, he added.

SEMINAR ON "HIGH PERFORMANCE SURFACE COATINGS AND PRINTING INKS FOR PLASTICS" SATURDAY 16TH JANUARY, 1988

The Colour Society is planning a full day seminar on "High performance surface coatings and printing inks for plastics" on Saturday the 16th January, 1988 at Taj Mahal Hotel, Apollo Bunder, Bombay 400 039.

The Seminar will include invited lectures by eminent Scientists and Technologists and also presentation of original review papers. The following topics are being covered. 1. Coatings for industrial structures, 2. Tank and pipe coatings, 3. Heat resistant paints, 4. Coatings for silos/flooring and effluent tanks, 5. Surface preparation for high performance coatings, 6. Flexographic and gravure inks for plastics, 7. Plastic substrates for printing.

Original/review papers on the topics to be covered are invited for presentation at the seminar. Persons intending to present papers are requested to send extended abstracts of about 400 words in duplicate by 15th November, 1987. Abstracts shall be accepted for presentation after scrutiny, depending on time available and the relevance of subject on the theme of the seminar. Full text of papers can be submitted by 15th December, 1987 for publication in the Journal of Colour Society.

Registration of Delegates :

The registration charge for delegates attending seminar will be Rs. 125 per delegate for members already on the Colour Society and Rs. 200 per delegate for non members

Customs duty cut on copper urged

All the major industries associations connected with non-ferrous metals and their downstream products while sounding the Government about the adverse effect of the continuous increase in the price of copper, have urged for a customs duty reduction from the existing 140 per cent to 100 per cent.

In a joint press conference organised by seven industries associations Mr. Balakrishna Binani, President of the Indian Non-Ferrous Metals Manufacturers Association (INFMMA) said even after the duty reduction (if conceded by the Government), the Government would still be able to meet its target of Rs. 300 crores of customs duty collection for 1987-88 from copper. The cost of copper production in the country was on the higher side due to various factors such as low copper content in the ore and high cost of power, Mr. Binani said adding, however, that the problem would not be solved by increasing the import duty everytime the need arose.

The time had come, Mr. Binani continued, for the Government to evolve a system whereby the revenue thus collected by way of import duty on copper was utilised to compensate the high costs of Hindustan Copper Ltd. (HCL). If India was to fortify its industrial infrastructure, the use of non-ferrous metals had to go up which will only be possible when they were made available at more affordable prices, he said adding that for this the duty structure had to be revised downwards and brought to industrial levels from the current heights which were more appropriate to luxury items.

Pointing out the absolute amount of duty levied on copper rose from Rs. 4,500 per tonne in 1966 to around Rs. 36,000 per tonne today, Mr. Binani said the increase was nearly eightfold in a span of 20 years, whereas in the same period the average annual price of copper on the London Metal Exchange had hardly doubled. Attributing this phenomenal rise to the over protectionist attitude of the Government, he said the price of copper, which had touched an all-time high of Rs. 61,000 per tonne, would surpass Rs. 65,000 per tonne mark easily going by the present trend.

Leaders of other associations have strongly advocated the need for a pragmatic pricing policy for copper which would not only sustain the demand but also generate it significantly. Those leaders are: Mr. K. D. Kapadia (Indian Electrical and Electronics Manufacturers Association), Mr. K. Agarwal (Winding Wire Manufacturers Association), Mr. Navin Shah (All India Non-Ferrous Metal Industries Association), Mr. Darshak Mehta (Bombay Industries Association), and Mr. S. Morakhia (Bombay Metal Exchange).

BADLAPUR UNITS PLEA FOR INDUSTRIAL SECURITY

Kalyan Ambarnath industrial belt, which is part of the growing Bombay-Thane-Pune industrial complex, has made rapid progress during the last decade. The development of Badlapur Industrial area is also looking up on account of the opening up of new processing houses in this region, according to Mr. R. S. Bidawatka, president of the Kaylan Ambernath Manufacturer's Association.

Making a plea for industrial security, Mr. Bidawatka has stated in a communication to Mr. Mohan Wadhwa, police commissioner of Thane district, that Badlapur is out of Thane police commissionerate's jurisdiction. As the law and order and safety of the industrial property in the region is at stake, it will be in the fitness of things if Badlapur area is included in Thane commissionerate, so that the industry gets proper protection from the police department, the association has urged the Maharashtra government.

SEMINAR ON INDUSTRIAL HAZARDS

The Eastern India chapter of the Chemtech Foundation will organise a national seminar on "hazard and operability study for major hazard control in industry" in Calcutta on November 5.

The seminar proposes to highlight the modern approaches for indentification and analysis of potential hazards through the techniques of hazard operability and analysis studies, according to a press release issued in Calcutta recently.

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EXCESSIVE USE OF FERTILISERS

Foodgrain yield declines

Excessive use of chemical fertilisers in some parts of the country is proving counterproductive.

According to Krishi Bhavan sources, it has been observed that intensive cropping through cultivation of high yielding varieties with use of NPK chemical fertilisers is leading to heavy removal of micronutrients. The micronutrient deficiency has resulted in a ten per cent drop in grain yield in these areas.

These deficiencies are also caused by manifold increases in the use of high analysis fertilisers like DAP and urea which are devoid of micronutrients, inadequate use of organic manures and cultivation of marginal and problem soils.

Micronutrients are the essential nutrients required by plants in small quantities. These include iron, manganese, zinc, copper, boron, molybdenum and chlorine.

Since the micronutrients are directly involved in the nutrition of crop, their deficiency causes imbalances in the plant system affecting the various physiological activities and ultimately affecting crop yield.

According to a survey conducted by the Indian Council of Agricultural Research (ICAR) under the all-India coordinated scheme of micronutrients in soils and plants, the deficiency of zinc has been found to be widespread in Haryana, Punjab, Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Tamil Nadu and Bihar, followed by iron, copper and manganese.

There are about 441 laboratories, including 101 mobile units, to test the soils for nutrient deficiencies under an Indo-UK bilateral programme. The Union government has supplied atomic absorption spectro-photometers free to various states for micronutrient analysis.

The government is taking various other steps to counter the micronutrient deficiency in soils. Through various extension programmes, farmers are being educated about the proper use of fertilisers.

To ensure the production and marketing of quality micronutrient fertilisers, the government has included nine micronutrient fertilisers in Schedule I of the Fertiliser Control Order.

Presently, only zinc sulphate is being produced in the small-scale sector. The installed capacity is about 70,000 tonnes per annum in about 100 units scattered in different parts of the country. However, the actual production is only 30,000 to 50,000 tonnes per annum.

The micronutrient fertilisers are not under any regulatory price control. However, they are covered under the Fertiliser Control Order for monitoring their quality.

There have been representations from multi-micronutients manufacturers who want the government's permission to market the multi-micronutrient mixtures. An expert committee considered their suggestions in detail and suggested that it will not be desirable to allow the use of micronutrient mixtures as the range of deficiency and toxicity is very narrow in the case of micronutrients. The issue is, however, being taken up again with ICAR to test the agronomic suitability of some mixtures.

The power for approval of different grades of fertiliser mixtures has been withdrawn from state governments and now rests in the Central government. However, the power for issuing registration certificate for manufacture of approved grades of fertiliser mixtures continues to rest with the state governments.

TAX HOLIDAY BENEFITS FOR EXPORT ORIENTED UNITS

The benefit of tax holiday will be extended to cent per cent export oriented units (EOUs) as is admissible to the units located in the export processing zones/free trade zones. The tax holiday can be availed by the units at their option for a block of five years during the first eight years from the commencement of production of the units, says a public notice issued by the office of the Chief Controller of Imports and Exports.

The EOUs will be permitted to subcontract part of their production for job work to units in the domestic tariff area on a case to case basis.

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Imported DAP to be released

The government has ordered the release of imported DAP in the market during the current rabi season dealing a severe blow to the indigenous fertiliser manufacturers.

The fertiliser allocation plan for the 1987-88 rabi has left 50 per cent of the indigenous production uncovered and while calculating the demand-supply position of phosphatic fertiliser, the government has ignored the production and capacity of SSP units.

Another aspect of the allocation plan is that some manufacturers of urea have been allowed to supply their material to the states not allocated to them in the plan but it has been made clear that no freight would be paid to them for these supplies.

The plan says that in order to meet the "likely shortfall in the availability of DAP from the indigenous sources due to inadequate availability of phosphoric acid, it has been decided to release the available stocks of pool DAP so that it becomes available to the farmers for basal doses."

Most of the indigenous DAP production depends upon imported phosphoric acid as raw material. Every six months negotiations take place for its imports.

Industry sources say that this year the government intentionally delayed these negotiations with the result that the DAP production suffered heavily during August, September and October.

The negotiations were completed early this month and the first ship is expected to arrive later this month. The indigenous production of DAP is expected to arrive in the market in December only.

While taking the plea that not sufficient quantity of phosphatic fertiliser would be available during the current rabi season, the sources point out that the government did not take into consideration the production and capacity of SSP units in the country.

The sources say that the government should have released the imported DAP only in the pockets where there might have been shortage of phosphatic fertilisers instead of giving a blanket permission to the handling agencies to release the entire quantity in the market thereby creating a panic among manufacturers. This is likely to lead to a price war too, they point out.

Another problem facing the DAP manufacturers is that since the P_2O_5 applications are made mainly during rabi and because of the fact that the indigenous production would be available only from December onwards, very little of the indigenous production would be sold this season. This means that the manufacturers would be made to carry their stocks for one full year till next rabi.

The sources say that around 3.4 lakh tonnes of imported DAP is planned to be released in the market during the current rabi season.

The sources are also surprised at the plan leaving 50 per cent of the indigenous production of fertilisers unallocated. They say that at the time of the draft supply plan, they were given to understand that it would cover 85 per cent of the stocks held on October 1, 1987 and about 60 per cent of indigenous production of nitrogen in a manner which would punish those who had sold their stocks at a discount and reward those who had not.

However, they point out that the final allocation plan has not done any such thing.

Surprisingly, the plan mentions that Spic can supply urea to West Bengal, and RCF, Iffco and Kribhco to Tamil Nadu but no extra freight would be paid to them for such supplies.

The sources say that it is obvious that the government wants these manufacturers to make these supplies fearing shortage of urea in these states. If so, there is no justification for it not to give them the freight, and if no shortage is expected in these states then why should these manufacturers be allowed to sell their urea there as it would lead to a price war there.

GLUT IN SALT CAUSES CONCERN

Gujarat Chamber of Commerce and Industry has urgently called for a package of remedial measures to resolve the problem of mounting accumulation of salt stocks. Against an annual production of 101.16 lakh tonnes of salt, the industry is reportedly nursing stock of 63 lakh tonnes, particularly in Gujarat and Tamil Nadu.

Salt stocks are mounting because of higher production against stagnant domestic demand, slow progress in iodisation of salt, indifference in allotment of zonal quota, high railway freight of carrying salt and falling exports.

In a communication to the Union commerce and industry minister, Mr. J. Vengal Rao, the chamber chief Mr. Deepak Navnitlal has pointed out that this stage of affairs has not only jeopardised the growth of the industry but also hit the employment and welfare of lakhs of people dependent on it.

Under the circumstances, he has suggested that a package be evolved by which domestic and export demand for salt can be stimulated and the industry saved from the present crisis.

The position has become really alarming as many salt works in Gujarat are faced with closure on account of heavy accumulation of about 35 to 40 lakh tonnes of salt.

Obviously, this has resulted in distress sales by small manufacturers and traders in the state further aggravating the situation.

On the export front there has been a continuously declining trend in the face of increasing production. This is so because of the poor quality of salt coupled with poor loading of it at the ports. The situation has worsened because strong and attractive incentives are not available for its export. A pointer to the dismal export of 15 lakh tonnes of salt fixed for last year the actual export was only one lakh tonnes.

In his recommendations to remedy the situation, Mr. Navnitlal says that to improve the quality of salt it is absolutely necessary to set up more washeries. Besides, iodisation of salt should be given maximum possible encouragement and assistance given for technological upgradation

Licensing norms for MRTP, FERA cos. liberalised

The Government has liberalised licensing procedures for companies coming under the ambit of the MRTP and FERA companies to promote development of backward areas. This is part of a series of measures announced in New Delhi on Oct. 21 to liberalise industrial policy and procedures. Delicensing for MRTP and FERA companies has now been extended to 28 industries coming under Appendix I of the industrial policy and 24 non-Appendix I industries, subject to the condition that these are located in backward areas.

In the case of the non-appendix industries delicensing facility will only be available for units set up in category "A" districts and not category "B" and "C" backward districts.

Among the Appendix I industries included in this list are 82 bulk drugs and formulations, steam turbines, industrial machinery, diesel generating sets, electronic components and other high technology reproduction equipment. The non-Appendix I industries include steel structurals, agricultural implements, fuel efficient stoves, canned fruit and vegetable products, leather goods and soap toilet preparations.

In separate notifications, the government has also announced incentives for manufacture of steel ingots, and minimum economic scales of operation for the toilet soap industry.

The industry ministry has decided to allow steel casting units which have installed electric arc furnaces of a capacity of 15 tonnes and above to manufacture steel ingots or billets. The toilet soap industry has also been brought within the ambit of the scheme for minimum economic scales of production by fixing the minimum economic scale at 15,000 tonnes per year.

Earlier, in May 1985, the department of company affairs had exempted 27 industries of high national priority from obtaining approval under Sections 21 and 22 of the MRTP Act. Subsequently, 20 industries from this list had been exempted from licensing provisions in case these were located in backward areas. In February 1986, the department of company affairs extended the original exemptio

industries subject to certain conditions.

The above mentioned facility of delicensing is subject to the following conditions : — 1) The industrial undertaking will not be located within a radius of 100 km. from cities having a population of more than 25 lakhs according to 1981 census. These cities are : Ahmedabad, Bangalore, Bombay, Calcutta, Delhi, Hyderabad and Madras. (II) The item of manufacture is not reserved for exclusive production by small scale industrial undertakings by any order notified under Section 29-B of the IDR Act, (III) The owner of an industrial undertaking, person or authority making the proposal shall submit to the central government in the department of company affairs for the purpose of record, a memorandum containing the details of the proposal, alongwith a copy of their application for registration of the undertaking made to the DGTD, (IV) FERA companies should obtain clearance under the FERA in accordance with the provisions of that act.

Industrial undertakings eligible for delicensing under this press note are required to register themselves with DGTD. Where the activity proposed to be undertaken is of highly polluting nature, the DGTD will in the first instance accord registration on a provisional basis which will be converted into final registration only after the prescribed pollution control requirements are fulfilled by the concerned industrial undertaking.

It may be noted that the following industries delicensed for MRTP FERA companies have already been delicensed for non-MRTP/FERA companies.

Part-I (appending Industries) : Sponge iron and pelletisation, steam turbines of and below 20 Mw and mini and micro hydel system equipment, Power and distribution transformers, power capacitors and switch gears, diesel generating sets, electronic components, industrial machinery, plastic moulded goods, jigs, fixtures, tools and dies of specialised types and crossland tooling engineering production aids such as cutting and cms. based on internal combustion engines, high technology production and multiplication equipment, word processors, electronic cash register/invoicing machines, dictaphone, microfilming/micro fich-readers, surgical instruments, sterilizers, incubaters and the like, watermeters, steam meters, electricity meters and the like, scientific instruments, medical gases, refrigerant gases like liquid nitrogen, carbon dioxide etc, in large volumes, argon and other arc gases, tonnage plant for manufacture of industrial gases, writing, printing and wrapping paper from agricultural residue, waste and bagasse, cotton seed linter pulp, vegetable oils, namely — (a) solvent extraction of oil/oil cakes from minor seeds excluding cotton seeds, and ricebran oil, detergents of ISI standards, refractories and furnace lining bricks, H. T. Industries, graphite ceramics, gypsum boards following bulk drugs/drug intermediates, and formulations based thereon with an overall ratio of bulk drugs consumption from own manufacture to formulation from all sources of 1 :5 as listed below : aspirin, digoxin, hydrochlorothiazide isonicotinic acid hydrazide, thiacetazone, tolbutamide, pas acid, pas sodium, calcium pas, calcium b.pas, chloramphenicol, amoliaquine, chloroquine, diethyl carbamazine citrate, frusemide, glyceryl trinitrate, phonalyl, preeinsolens, ether anaesthet halothane, thiopental, lidocaine, procaine, nitrous oxide, ibuprofen, chloropheniramine, epinephrine, mebendazole, biphenium hydroxy naphtheate, metronidazole, ampicillin, sulphamethoxazole, trimethoprin, erythromycin, ethambutol, pyrazinamide griseafulvin, hydroxy cobalamine/cyanocobalamine, dexiran, isesorbide dinitrate, propranolol, verapanil, hydrallazine, methyl dopa, neomycin, bactracin, betamethasone benzoate, sulphacetamide, pilocarpine, hamatropine, chlorhexidine, cetrimide, parachloro-(metaxylenel) promethazine, dexamethasone, ethyl oestradiel, norethistorone, glybenclamide, chlorpropamide, neestigmine, suxamethemium (succinyl choline chloride), ergometrine, methyl ergometrine, oxytocin, amitriptrine, imipramine, irilluoperazine aminophylline/theophyline salbutamol/ephedrine, vitamin A, vitamin D, vitamin C, pantotheates, ferrous salts, chlorpromazines, hydroxyllinyl theophylline, doxycyclin

Part-II: Steel structurals, gas lamps, cycles, agricultural implements, hand tools and small tools other then those covered under entry no. 8 of part-I, pressure cooker, cutlery and steel furniture, lanterns of all types, fuel efficient stoves, waterpumps beyond 10 cms., based electric meters, industrial sewing machines, multiplication and reproduction equipment other than those covered under entry no. 10 of part-I, cash registers/invoicing machine other than those covered under entry no. 12 of part-I, weighing machines other than electronic types, mathematical surveying and drawing instruments, industrial gases other than those covered under entry no. 19 of part-I, canned fruit and vegetable products, protein and processed foods, vegetable based weaning food, marine products and cattle feed, soap, cosmetics, perfumery and toilet preparations, leather goods, surgical and medical rubber products, glassware, chinaware, pottery and sanitaryware, tiles, insulating boards, and printing, including litho printing.

DRUG UNITS TOLD TO PLAY GREATER ROLE ON RESEARCH

The World Health Organisation (WHO) appears to have woken up to the need to associate with the Indian pharmaceutical industry in its tropical disease research and training programme (TDR).

Dr. T. Godal, a WHO director and leader of a TDR team currently touring the country, said his organisation was keen on contribution from the R and D sector of the Indian industry towards developing new drugs for tropical diseases. But beyond this general statement, he could not give any hint or direction to R and D personnel who had come to meet him.

At a meeting organised by the basic chemicals, pharmaceuticals and cosmetics export promotion council at Bombay on Oct. 20, its chairman Mr. Ramu Deora acquainted the WHO team about the strides made by the Indian industry in the production of bulk drugs and formulations. The WHO delegates, who acknowledged the progress made by the Indian industry, however, evaded the subject of buying bulk drugs and formulations from Indian companies.

Industry sources said WHO bought large quantities of drugs from the developed countries in its programme to eradicate tropical diseases. Similarly, in the development of drugs to combat tropical diseases, it collaborated with Western multinationals like Hoffman La Roche, Burroughs Wellcome and Smith Kline and French.

ALGAE MAY YIELD DRUGS IN FUTURE

British research on culturing algae in controlled conditions is approaching the stage when it will be a commercially viable operation. The products can be used to produce various high value organic compounds for the food and drug industries. Some of the most promising products that can be extracted from algae are polyunsaturated fatty acids like ecosapentanoic acid and gamatinolenic acid. Algae and fish oils are the only sources of these. They are widely used as diet supplements, or to counter arthritis, for example.

Fermentation is a time-honoured method of producing a valuable organic chemical, alcohol, from microorganisms. The organism involved in this case is yeast, which is a fungus. Now scientists in the Microbiology Department of Queen Elizabeth College, London, have developed the idea further by using algae to produce valuable products by growing them in tubes under controlled environmental conditions.

Large banks of tubes with algae circulating in solution inside them may cover many square metres. These "photobioreactors" produce algae very efficiently even with low levels of sunlight.

A British science journal says the photobioreactors convert sun light much more efficiently than growing algae in open air ponds. Although ponds are much deeper and can have a greater depth of algae to absorb the sunlight, photobioreactors can accommodate over 200 times the densities of algae. This is mainly because the system is totally closed and much easier to control.

The algae can be harvested continually by sedimentation. Oxygen, produced as a waste product of photosynthesis, can also be collected from the reactor.

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Repairing damaged rig costs ONGC Rs. 20 Crores

Oil and Natural Gas Commission (ONGC) has paid out more than Rs. 20 crores in foreign exchange for repairing one of its damaged offshore drilling rigs.

This costly and uneconomic repairs lasting more than 30 months in Dubai and Japan were carried out on the jack-up rig "Sagar Pragati". ONGC bought this rig in 1981 from CFEM of France for about Rs. 28 crores.

The rig was out of operation since April 1985 and was received by the ONGC early this month after repairs in Japan.

Meanwhile, the ONGC had hired replacement rig from foreign contractors for drilling in offshore Bombay High. The average daily hire charges for a jack-up rig is $24,000. As the "Sagar Pragati" was under repairs for the past 30 months, the ONGC would have paid out another about Rs. 28 crores in foreign exchange as hire charges for the replacement jack-up rig.

The ONGC has, so far, received only Rs. 9.28 crores from the insurance company towards repair costs and the departmental charges against insurance claim of Rs. 16.75 crores already made according to official sources.

Neither the government nor the Parliament and its various committees have scrutinised this costly repairs of Sagar Pragati.

The ONGC started looking for a suitable shipyard to repair the drilling rig — Sagar Pragati in April 1985 following detection of cracks on its hull and legs. On discovery of cracks, the rig was withdrawn from drilling operations from Bombay High and a decision was then taken to tow it to Dubai drydocks for repairs.

Disaster struck the rig during its journey from Bombay to Dubai. The rig lost its second leg when it was caught in a cyclone in the Arabian Sea, in June 1985. The rig limped into Dubai drydock and continued to languish for another 18 months without any substantial repairs.

During this period, senior officials of the ONGC were frequently visiting Dubai for inspection and scrutiny of tender documents for repairs, in addition to the crew members of the rig. They had to be paid daily allowance in foreign exchange.

In September 1986, the ONGC decided to transport the Sagar Pragati to Japan for installation of its legs being fabricated by Hitachi Zozen. During this journey from Dubai to Japan, a typhoon struck the rig, ripping of the Derrick mast virtually reducing the legless rig to a floating junk.

The rig after repairs at Hitachi Zozen in Japan returned to Bombay early this month, 30 months after it left the Bombay harbour for repairs. In Dubai, it is now being deployed for work-over of sick oil wells in Bombay High offshore, according to official sources.

Oil industry sources pointed out that ONGC could have possibly purchased two similar jack-up offshore drilling rigs with the total foreign exchange spent on the repairs of Sagar Pragati and the hire charges for the foreign contractors for the replacement rig and other departmental charges. The ONGC's overall drilling performance also suffered with the shortage of offshore jack-up rigs, during this period.

The drilling in Bombay High offshore had been done mostly with on charter hire from foreign firms as ONGC's own rigs were on repairs most of the time. The ONGC's own rigs which were under repairs for many months in 1986 include Sagar Gaurav, Sagar Ratan, Sagar Prabhat and Sagar Vikas.

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Import of sodium alginate, othe than dental grade (5 per cent) will no be allowed against the export of al types of finished leather, leather belting, pickling bands, buffers, sheep cal roller skins and leather aprons unde the replenishment policy.

A public notice amending the Im port-export policy volume 1 (pag 258) was issued by the chief contro ler of imports and exports on Octob 19.

ONGC fixes offshore target

In 1987-88 ONGC proposes to drill over 256,000 metres in various offshore fields covering 107 wells of which 34 will be exploratory and 73 developmental.

The structures to be covered by the proposed drilling are located in Krishna-Godavari basin, Andamans and West Bengal.

ONGC's target for offshore drilling for the Seventh Plan has been set at about 15,62,500 metres, consisting of about 852,500 metres of developmental and 7,10,000 metres of exploratory drilling. A total number of 572 wells, comprising 367 developmental and 205 exploratory, will be covered at an estimated investment of over Rs. 4,000 crores.

Ever since ONGC embarked upon offshore operation, a total number of 580 structures have beeen taken up for drilling in both east and west coasts. The drilling of 43 wells have led to significant oil discoveries. Between April 1980 and now, oil and gas have been struck in 28 offshore structures, which exclude Bombay High and a few other structures.

ONGC's production of oil from offshore fields went up from five million tonnes in 1980-81 to about 21 million tonnes in 1986-87.

A total of 21 rigs are now engaged in different offshore operations. Eight of these rigs are owned by ONGC and 13 others have been acquired on charter. Five of the eight owned rigs are managed by ONGC itself while the remaining three are operated through management sevices

The phasewise plan for taking over the management of rigs has already been drawn. In order to supplement its own effort in offshore drilling and encourage indigenous capacity, ONGC is currently encouraging contract drilling by Indian companies through joint ventures with reputed international companies.

Apart from drilling rigs, ONGC has acquired several other vessels such as seismic survey vessels, acid boat, stimulation vessel, geo-technical vessel and multi-purpose support vessel. ONGC also owns a large number of offshore supply vessels, the majority of which are to be disposed through a joint venture with the Shipping Corporation of India and a few would be sold to other companies.

The first offshore structure taken up for drilling was Bombay High where the bulk of offshore reserves is located. The production from Bombay High started in 1976 through one platform at the rate of 4,300 barrels a day.

The production has since been raised to 500,000 barrels a day. The development of Bombay High operation has been done in a number of phases through installation of a large number of platforms and laying of pipelines.

Till February this year, four major process platform complexes have been installed and commissioned in Bombay High apart from two water injection process platforms.

Apart from Bombay High, three other offshore oilfields have been developed in the west coast. These are Ratna field, which commenced production in November 1982, Heera field, in March 1984, and Panna field, in December 1986. A significant development of Panna field has been the use of early production system.

During the past one year, ONGC has introduced several new technologies such as sub-sea completion system and horizontal drilling to step up production from offshore operations.

The sub-sea completion system, considered suitable for such depths as are not fit for conventional platforms, is being introduced in Bombay High, though there is a proposal to use it also in the Krishna-Godavari basin where oil has been struck in deep waters.

The horizontal drilling which is required for producing oil from thin columns has been introduced in Bombay High.

Another important development in Bombay High has been the discovery of basement oil which is expected to extend the life of the field.

ONGC'S MOVE TO FIGHT POLLUTION

The Oil and Natural Gas Commission (ONGC) will soon set up an institute for petroleum safety and environment to find ways of lessening sea pollution, Mr. K. Manglik, member, technical, said on Oct. 20.

Working in collaboration with the National Institute of Oceanography, Goa, the ONGC plans to find ways of checking sea pollution caused by spillage and onshore pollution caused by flaring of gas, through effluents and also eco-disturbance by ONGC's operation in oil producing areas.

The institute which is likely to be set up in Goa, will do a pioneering service in planning ONGC's operations with minimum environmental disturbances, Mr. Manglik said.

OIL STRUCK AGAIN IN CAUVERY BASIN

The ONGC has struck oil and gas at Bhuvanagiri-II well in the Cauvery basin, 10 km north-west of the temple and university town of Chidambaram.

According to ONGC sources, oil was flowing at the rate of 206 barrels a day and gas at the rate of 52,000 cubic meters. Further testing was in progress.

The latest discovery, the first in the Ariyalur-Pondicherry sub-basin of the Cauvery, has confirmed that the Cauvery basin is emerging as a major oil-bearing region. Oil has already been struck at Kovilkalappal and Narimanam onland and PU-1 and PH-9 offshore. The prognosticated resources of the basin are about 370 million tonnes (130 million tonnes onland and 240 million tonnes offshore).

The Narimanam and Kovilkalappal wells which were brought under early production system have already supplied about 92,000 barrels of oil to the Madras refineries. The initial supply of associated gas from Narimanam-I is estimated at about 4,000 cubic meters per day. The ONGC has already signed an agreement with a private sector steel rolling mill at Nagapattinam for the supply of gas. The Tamil Nadu Electricity Board has also shown interest in utilising the gas for power generation.

INDUSTRIAL PRODUCTION DROPS IN MAY

The quick index of industrial production for May shows a growth rate of 7.4 per cent over the corresponding of last year.

This is a sudden drop from the growth rate of 14 per cent for April, 1986, and an average of 14.6 per cent in the first four months over January-April 1986.

The steep fall in the growth rate for April brings down the growth rate for the first two months of the financial year to 10.7 per cent.

Jhalora enhanced oil recovery plant on stream

The Oil and Natural Gas Commission (ONGC) has successfully commissioned its pilot plant at Jhalora in Gujarat. After Sanand, also in Gujarat this is the Commission's second enhanced oil recovery (EOR) pilot plant. The plant would provide further momentum to the EOR techniques initiated by ONGC for additional oil recovery from its producing fields.

Jhalora, the second polymer pilot plant of the Commission, is a project costing over Rs. 5 crores. It comes under the Company Basin Petroleum Project (CBPP), which is partly financed by a World Bank loan of $242.5 million.

ONGC sources claim the Jhalora plant as one of its dynamic responses to the energy challenges facing the country. Envisaging a demand of 100 million tonnes of oil equivalent of gas by 2005 AD through its corporate plan, ONGC has evolved a series of strategies covering the entire gamut of oil industry from exploration to production. EOR is one such strategy.

Oil exploration, world over, is limited by the fact that only a small amount is actually recoverable. According to reliable estimates, nearly 75 per cent of the world's oil (about 200 billion tonnes) still remains underground. Thus, if the average rate of recovery from all fields, discovered or otherwise, were to go up by 10 per cent, it would yield 100 billion tonnes more of oil. This is equivalent to the world's oil consumption for 30 years as per current level.

Throughout the oil-producing regions of the world, the focus is on EOR. ONGC has taken the lead and has already initiated nine pilot EOR schemes in western India. These projects have been given a trial in the fields of Sanand, Ankleshwar, Balol, Lanwa, Kalol, Galeki and Jhalora, all in the Cambay basin of Gujarat.

Several techniques are used depending on the properties of the crude and reservoir conditions. Thus, in the plants of Jhalora and in Sanand, which was commissioned earlier, the reservoir is flooded with polymer solution. This would improve the mobility ratio and the sweep efficiency in the reservoir resulting in better recovery.

For the viscous crude of Balol yield, in-situ combustion and steam-flooding techniques are employed. In-situ combustion involves burning a small part of the oil in the reservoir and discing the remaining oil. In the second technique, steam is generated at the surface and injected into the reservoir. In both the cases, the high temperature reduces the viscosity of oil, helping additional recovery. Injection of carbon dioxide, caustic solution and LPG slugs are the other EOR techniques envisaged for the rest of the fields.

Recovery rates due to EOR techniques can be quite substantial. In Sanand where the primary recovery is estimated at about 14 per cent, an additional recovery of 21 per cent is expected to yield about 2.66 million tonnes. When implemented on commercial scale, these EOR schemes are expected to effect an aditional recovery of 40 million.

At the Jhalora plant, from the 1300 meter-deep sand stones reservoir, a primary recovery of 32 per cent is expected. EOR of polymer flooding can possibly yield an additional 10.4 per cent, about 1.2 million tonnes of oil.

COCHIN AROMATIC PROJECT IN 1989

The aromatic project of Cochin Refineries Ltd. (CRL) for the manufacture of 87,200 tonnes of benzene per year is expected to go on stream by February 1989.

The project also includes manufacture of 12,000 tonnes of toluene per year.

CRL which made significant progress in its production and financial position during 1986-87 has paid 12 per cent dividend of Rs. 44.37 lakhs to the Government for the period, an official release said in New Delhi on Oct. 23.

During the year, the company registered a record production of 4.166 million tonnes, capacity utilisation being 93 per cent.

The company showed a 40 per cent increase in its turnover and 70 per cent increase in its operating profit over the last year. Its turnover for the year 1986-87 was Rs. 803.02 crores as against Rs. 548.54 crores in 1985-86, the release added.

OPEC CHEIF'S HOPES ON OUTPUT LEVEL

The fourth quarter oil production of OPEC should hold at 18.3 million barrels per day, its President Mr. Rilwanu Lukman, said on Oct. 23.

He told reporters at the oil and money conference on London Oct. 23 that $ 18 per barrel remained a "Justifiable" price but conceded that to maintain oil production levels and prices was 'a difficult balancing act."

At their June summit in Vienna, the OPEC members agreed a quota of 16.6 million BPD per quarter for the second half of this year.

Between now and December, there was room for price movement between $ 18 and $ 20 to compensate for the devaluation of the dollar, Mr. Lukman said.

ONGC TO EXPLORE DEEPER WATERS

The Oil and Natural Gas Commission, will launch an exploratory thrust in deeper waters for establishment of additional oil reserves.

The ONGC chairman, Mr. S. P. Wahi, said that the exploration in deeper waters offered tremendous potential and calls for extensive studies for prognostication of the oil resources.

Technology for the working in deeper waters had to be developed keeping in view the developments abroad, he added.

ONGC ACQUIRES SOPHISTICATED DESERT RIG

The Oil and Natural Gas Commission (ONGC) has acquired a sophisticated desert rig E700 as part of its intensive exploration strategy chalked out for the western region.

The rig, according to official information received in Baroda has been manufactured indigenously by the Bharat Heavy Electricals Ltd. (BHEL) at a cost of Rs. nine crores and will be set up to dig its first well at Ghotaru in Rajasthan.

The rig, unlike conventional rigs, is specially equipped to meet the transportation requirements in desert conditions, so that the time required for transportation is a mere two-three days as compared to the normal 40 days Gas supply is expected to commence shortly after the setting up of certain infrastructural facilities.

Air pollution knows no boundaries

Chernobyl a year ago demonstrated the fact frighteningly: Contaminated air can escape from behind even the most secure national borders.

The explosion of a nuclear reactor in the Soviet Union sent telltale clouds across several international boundaries — to Poland, Finland, Sweden and beyond. Pollution is everywhere. The Scandinavians are angry with the British over acid rain. Canadians are impatient with the United States for the same reason: most emissions from North America's heartland fall on eastern Canada as well as northeastern United States. Dust from China drifts across the north Pacific and is detected by airmonitoring lasers atop Hawaii's Mauna Loa volcano.

The most polluted place on earth, Mr. Noel Grove writes in National Geographic, may be Cubato, Brazil, called the "valley of death" by its residents. Scores of industrial plants, including a petrochemical complex, pump at least 75 pollutants into Cubato's air, raising contamination levels in parts of the city of 100,000 to twice those considered safe for humans.

ACID DEPOSIT

Breathing the air in Mexico City on some winter mornings has been compared to smoking two packs of cigarettes a day. The culprits — vehicle exhaust, factory smoke and smouldering refuse heaps. In Athens acid deposit has caused more erosion on ancient marble Parthenon in the past 24 years than had occurred in 24 centuries.

In the United States the Environmental Protection Agency points out that nearly 80 million Americans live in countries where ozone levels exceed air quality standards and 61 million breathe too much carbon monoxide. When it occurs in smog, ozone is a noxious form of oxygen. Nationally, the agency says, overall air quality has improved since 1975 in well-known and regulated pollutant such as sulphur dioxide, carbon monoxide and lead. The world, however is in the midst of a chemical revolution in which some 65,000 commercial compounds enter the environment each year. Some are proven cancer-causing substances and many more are suspected. Yet only eight chemicals are listed as hazardous and are regulated at their source by the agency.

Americans spend more than $10 billion a year on medical problems caused by outdoor pollutants, Mr. Grove reports. Ozone resulting from automobile emissions annually reduces crop yields significantly, some times by as much as 20 per cent, in the case of soyabeans. Even the earth's poles are not exempt from contamination. Until the arrival of spring each year, the North Pole resembles a turn-of-century coal town. In winter, when the Arctic is tilted into constant night and the sun cannot generate cleansing winds and precipitation, the largest single mass of pollution sits atop the globe like a dirty cap.

Scientists now able to analyse samplings as small as one part per trillion parts of air can trace pollution to its source.

Most North Pole pollution has been pinned to a mineral-rich smelting area in the Soviet Union's Ural mountains. In contrast, Mr. Grove writes, the South Pole seems fairly clean because 90 per cent of the world's population lives in the northern hemishpere. Yet, during the past eight years the protective ozone layer has become thinner each spring over the pole.

A major hole was detected in late 1985. In the upper atmosphere, 12 to 30 miles above ground, ozone intercepts the sun's damaging ultraviolet radiation. Scientists differ on the possible culprit — industrial chemicals, solar cycles, or perhaps simpy rising of air from the lower atmosphere.

Globally, the levels of carbon dioxide, which holds heat close to the earth, are 27 per cent greater today than they were before 1850, scientists have found.

Fossil-fuel consumption is, however, on the rise in the rapidly developing countries of Asia, Latin America, and Africa. Scientists worry that growing burden of carbon dioxide and other gases, such as methane, may raise global temperatures. — National Geographic News Review.

WORKING GROUPS TO STUDY GLOBAL ENVIRONMENT PATTERN

Scientists have set up eight working groups to understand and predict changes in the global environment pattern.

The interaction between the biological, chemical and physical processes that regulate the total earth system will be delineated by the 'International Geosphere-Biosphere Programme: a study of Global Change (IGBP)'. The Committee for the Global Change Programme which completed its first meeting in Paris recently decided on the setting up of the working groups. Improving the understanding of the cycling of elements between the terrestrial, fresh water and marine ecosystems and the atmosphere, the natural and anthopogenic effects on these cycles, the essential linkages between the biosphere and the geosphere and changes in transfer rates between the various components of the total earth system are all on the agenda, according to Science International, published by the International Council of Scientific Unions (ICSU).

The working groups will deal with the following subject: global geosphere-biosphere modelling; data and information systems; techniques for extracting environment data of the past; geo-biosphere observatories; biosphere interaction with atmospheric chemistry biospheric aspects of the hydrological cycle; effects of climate on ecosystem changes and understanding the role of marine ecosystems.

The programme will be developed on the basis of cooperation with national and international agencies "responsible for related programmes and also for stimulating inputs from other members of the ICSU family".

Recent advances in science and technology like precise observation of the earth from satellites, increased computing capacities, and improved analytical techniques will "advance our ability to predict change in the global environment". Physical models of the earth system developed within the framework of the joint ICSU-World Meteorological Organisation World Climate Research Programme will help in this process

HDPE woven sacks units in a fix

Consumers propose it, but the Government disposes it. This seems to be more true in the case of HDPE woven bags industry, the products of which are preferred by consumers in the fertiliser and cement industry to that of jute bags. But the Government, which had succumbed to the pressures of the jute lobby, by clamping the draconian jute mandatory order, seems to think otherwise, according to industry sources.

A section of the industry has filed a petition in Guwahati Court, on September 16, which is returnable in two months time, issuing notice on the respondents, the Union of India, to show cause as to why the jute order should not be stayed. The industry was pained to hear a stay order Andhra Pradesh in May, obtained by cement units and other consumer organisations, vacated by the court on the issue of this discriminatory order on jute bags reservation. In Maharashtra also, HDPE units and consumer organisations have field a petition seeking a stay of the jute order.

If nothing clicks and the Government stays adamant to the pleas of HDPE sacks industry, the latter has proposed to take up the matter to the Supreme Court, the sources say.

Industry sources feel that the demand for industrial sacks will go up to 3,600 million sacks by 1988-89, which is equivalent to 3.6 lakh tonnes of HDPE/PP resin or 18 lakh tonnes of jute, while the production in case of jute is a four-year average of 10 lakh tonnes and the HDPE capacity is of two lakh tonnes. This clearly indicates how both the industries can co-exist and need no strigent laws to protect an industry to the deteriment of the other. But the Government has cast all the reasonable arguments to the winds and seems to be sticking to its stand, which is killing the HDPE woven sacks industry slowly, these sources argue.

Cement Manufacturers Association of India have been intimating the Govt. of the more and more evidence pointing to consumers gravity resistance to jute bags, which result in losses for the industry and blunts its competitive edge. And even after this, the Government, instead of bailing out the HDPE units, and giving them a fair share in the growing market. It is sitting on the files, sources allege.

The jute order has put the high density polyethylene (HDPE) woven sack units virtually on the brink of collapse with nearly 200 of them having already downed their shutters. The new policy which stipulates that 70 per cent packing for cement and 50 per cent for fertiliser must be done in jute bags, is a flagrant move of the jute lobby and the Government to kill a budding industry, which the same Government encouraged some time ago, according to sources. After the jute order, the capacity utilisation has fallen to 23 per cent from 44.91 per cent for the HDPE sacks industry, 82 per cent of which are in the small-scale sector.

But what is intriguing and startling for the industry is the Government's inaction and failure to get to the root of the problem and succumbing easily for political reasons to sacrifice one industry for another while there is scope for both industries to co-exist.

The Fertilisers Association in a letter to Mr. Jaichandra Singh, clearly indicated the packaging needs of the fertiliser industry and the advantages of HDPE woven. He wanted the Government to work out a long-term policy on this since the HDPE sacks are competitive, easy for transportation and prevents pilferation of fertilisers, which the farmers keep for a longer time in his fields.

Then came the plea of the Cement Manufacturers Association (CMA), who contended in a letter to the Development Commissioner for Cement industry in May, that jute bags caused much loss to the consumers of cement, which at present, has a buyer's market and packaging must be competitive enough since seepage in jute bags is as high as five per cent. Earlier, CMA had sent a letter to the Industry Ministry pleading not to make jute mandatory legislation. To all these the Government turned a deaf ear since the jute lobby has big names while the HDPE bag industry consists of helpless small entrepreneurs, the sources allege.

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Commodity plastics duty cut hailed

The government decision to slash he customs duty on 6 widely-used ommodity plastics namely low densiy polyethylene, high density polyethlene, PVC, polystyrene, polypropylene opolymer and polypropylene homopoymer last month has brought about a welcome relief to 20,000 plastic proessing units in the country, writes . A. Francis in the Economic Times.

Imports of all these plastics had almost stopped some time ago with a 70 per cent increase in their prices in the nternational market as a result of a worldwide shortage of commodity plastics.

The import of these items at current international prices and at old rates of customs duty was thus totally uneconomic to plastic units and many of them had even to close down their units in the recent past.

The duty reduction, now ranging from 30 to 60 per cent, once again makes the import of commodity plastics a workable proposition, industry sources point out. The duty reduction is more drastic on polypropylene copolymer and polystyrene, although there is a substantial reduction in the landed costs of other plastics also.

Most of these plastics were not easily available in the open market because of the inadequate domestic, production and restricted imports. This situation has also resulted in a sharp rise in the prices of some of the plastics in the open market.

There has, however, been a noticeable improvement in the availability of plastic materials in the market apart from a modest fall in their prices in the last few days.

The sources say that an important outcome of the import duty reduction on commodity plastics would be increased availability of these materials from various international sources. There has been instances where several countries, which are preferential sources, had formed cartels and had jacked up prices to take advantage of lower rates of duty. The basic import duty has been always half of the normal rate, if these plastics are imported from preferential sources.

FINESTERS : ADDITIVES FOR PLASTICS

Fine Organics of Bombay, have brought out a wide range of Finesters as speciality performance additives for the plastic industry.

It is claimed by the manufacturer that these are highly useful in plastic processing for getting desired properties during processing and end-use properties of many types of plastics. The suitability of Finester as plastic additives is determined by its compatibility with the polymer to which it is added. Highly polar Finesters are incompatible with non-polar polymers such as polyolefins and hence, Finester migrates to the polymers surface during and after processing to impart lubricity, antistat, antifog and mold release properties.

In polar polymers like PVC, Polystyrene and ABS, Finesters are compatible and stays within the polymer to provide internal lubrication and improved flow properties.

Applications

Finesters are high grade additives formulated for many different purposes in the processing of plastics. They are non-toxic and hence also can be used in those cases where the finished plastic material is intended for applications involving future contact with food-stuffs.

Finesters as Processing Aids :

Without the use of various additives, many plastics would be impossible to extrude mold or otherwise process. When added to a plastic composition, Finesters it is claimed, can provide mold release to finished part, provide in-process lubrication, promote slip properties, improvo pigment or filler wetting properties or possibly allow lower processing temperatures.

Almost all of these functions can be provided by selecting one or more Finesters which often perform as multifunctional additives.

Further details can be had from the manufacturer M/s. Fine Organics, 15/2, Neelkanth Market, M. G. Road, Ghatkopar (E), Bombay-400 077.

SIP RESINS TO ENTER MARKET

SIP Resins is entering the capital market on November 2, with a public issue of six lakh equity shares of Rs. 10 each at par. The objects of the issue is mainly to meet the part of purchase consideration for acquiring the business undertaking, additional working capital for higher level of operations, transfer expenses etc.

The company which was incorporated in 1986, took over Southern Industrial Polymers Pvt. Ltd., which is the second largest producer of epoxy resins and systems in the country, marketed under the brand name 'EPOXY' established for over a decade. The total cost of the project is Rs. 180 lakhs.

Announcing the public issue at a news, conference at Bombay on 15th October, Mr. K. C. Raghunathan, Managing Director said that the average growth in turnover of epoxite brand resins and systems at 33 per cent per year in the industry. SIP Resins through its wide product range and strong infrastructural facilities in marketing, was confident of not only maintaining its market share, but also improving upon in the years to come.

He further said that the company would be completing its expansion stage I during 1987-88, thus making the unit the largest producer of epoxy resins and systems. The company would soon be diversifying into protective and fire preventive systems in oil drilling and natural gas operations, fertilizer complexes and refineries. This would be an import substitution. The negotiations for technical collaboration were at the conclusion stage with a leading company from Australia.

According to the projections, the company expects a turnover of Rs. 7.56 crores in 1987-88, Rs. 10.15 crores in 1989-90. It also hopes to earn a profit after tax of Rs. 40 lakhs Rs. 73.58 lakhs and Rs. 96.64 lakhs respectively. The company expects to declare a divident of not less than 15 per cent for the current year pro-rata and reasonable dividend thereafter, he added.

COMPANY PROFILE

NOCIL plans to hike turnover by Rs. 1000 crore

National Organic Chemical Industries (NOCIL), belonging to the Mafatlal Group headed by Mr. Arvind N. Mafatlal, has chalked out an expansion programme to achieve a massive additional turnover of over Rs. 1,000 crores from its Thane plant against a turnover of Rs. 225 crores. NOCIL proposes to spend a huge Rs. 1,300 crores on expansion and face-lift plan, subject to the Government clearance.

The expansion includes downstream products. NOCIL proposes to expand its ethylene capacity to three lakh tonnes per annum (same capacity as that envisaged for the Maharashtra Gas Cracker Complex), with corresponding increases in its other product-mix. It also proposes to undertake the manufacture of one lakh tonnes of polypropylene, styrene 1.04 lakh tonnes, polystyrenes 0.50 lakh tonnes, styrene butadiene rubber 0.67 lakh tonnes and polybutenes 0.15 lakh tonnes per year.

Letter of intent

NOCIL has obtained a letter of intent for the manufacture of phosphamidon and DDVP (organo-phosphorous pesticides) at Lote Parshuram, Ratnagri. Technology for the manufacture of these items has been obtained from National Research Development Corporation of India indigenously. The plant is expected to go on stream in the second half of 1988. The licenced capacity of the monocrotophos technical plant is re-endorsed at 657 tonnes per annum. The company has made an application to the Government for further re-endorsement of the licensed capacity of monocrotophos technical to 1,085 tonnes yearly.

Inception

NOCIL was incorporated on May 11, 1961 with the objects of manufacturing various organic and inorganic chemicals. An industrial licence was issued for the manufacture of certain chemicals by the Government to the promoter company viz., Standard Mills Company. The licence as endorsed in the name of NOCIL on May 20, 1961

In the later part of 1962, however, the manufacturing programme was revised. In April 1963, the Government issued a letter of intent to the company for setting up naphtha cracking operations and based on these operations the company submitted in December 1963 a revised manufacturing programme in collaboration with companies of the Royal Dutch/Shell Group, U.K. This revised manufacturing programme was approved by the Government in early 1964 and a new licence was granted on August 27, 1964 on the company having surrendered the earlier issued licence.

Accounts

NOCIL turned out satisfactory results for 1986. The gross sales were up by 13.75 per cent to Rs. 274.68 crores from Rs. 241.47 crores in 1985. The other income increased by 16.48 per cent to Rs. 8.13 crores from Rs. 6.98 crores last year. The total income recorded an increase of 13.79 per cent to Rs. 282.81 crores from Rs. 248.45 crores last year. On the other hand, expenditure rose by 13.79 per cent to Rs. 208.34 crores from Rs. 183.09 crores in the previous year and excise duty by 17.22 per cent to Rs. 25.87 crores from Rs. 22.07 crores last year. There was, however, a modest reduction in interest charges by 6.99 per cent to Rs. 11.05 crores from Rs. 11.88 crores a year ago. In 1984, the interest was Rs. 13.18 crores. The total expenditure increased by 13 per cent to Rs. 245.46 crores from Rs. 217.04 crores. In 1984, the total expenditure stood much lower at Rs. 199 crores compared to 1986 level.

The gross profit improved by 8.89 per cent to Rs. 37.48 crores from Rs. 34.42 crores in 1985. After depreciation, taxation and investment allowance reserve, the net profit moved up by 5.22 per cent to Rs. 16.73 crores from Rs. 15.90 crores last year. Adding the write-backs and the previous year's brought forward surplus, the disposable profit stood at Rs. 23.41 crores against Rs. 20.34 crores, showing an increase of 15.0 per cent.

R and D

NOCIL has set up an integrated and D Centre at Thane in 1981 mainly with a view to assisting the petrochemicals business to absorb, adap and up-date its technology. The recognition granted by the Governmen to the R and D Centre has been renewed up to March 31,1989. With the diversification into agrochemicals, th R and D Centre has been active i absorbing technology for the manufacture of monocrotophos earlier obtained from Regional Research Laboratory, Hyderabad. Now the R and D Centre is enagged in developing a range of aroma chemicals using the company's petrochemical products and by-products. The R and D Centre will undertake research work for a fee on behalf of Shell Research Ltd., U. K. for a period of three years from January 1, 1987.

The long-term outlook of NOCIL will get brightened, if the proposed huge expansion and modernisation at its Thane petro-chemical complex is approved by the Government. As stated earlier, the expansion and modernisation will make a total turnround in the fortunes of the company. The short-term outlook for the current year is to be viewed with a cautious optimism on account of fresh taxation and increase in custom duty for one year to combat the country's worst drought conditions in many parts. Besides, there will be a planned maintenance shut-down of the petrochemical complex for a period of nearly five weeks in November/December this year. The drought conditions are expected to hit the fortunes of its agrochemical unit also. NOCIL has, however, produced encouraging results during the first six month period ended June 1987 with the turnover rising by 15.68 per cent to Rs. 136.01 crores from Rs. 116.57 crores in the corresponding period last year. The gross profit has risen by 20.76 per cent to Rs. 16.81 crores from Rs. 13.92 crores in the same period last year. After depreciation (Rs. 6.73 crores against Rs. 5.32 crores) and taxation (Rs. 2.20 crores against Rs. 3.40 crores), the net profit has jumped by 51.73 per cent to Rs. 7.89 crores from Rs. 5.20 crores in the equivalent period last year.

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Seminars and Conferences

CECRI ORGANIZES TWO DAYS COURSE ON "SEPARATORS FOR LEAD ACID BATTERY INDUSTRY — DEVELOPMENTS AND TESTING"

A two days course on "Separators for lead acid battery-developments and testing" was conducted at CECRI Madras Unit on 22 and 23 September 1987.

Inaugurating the course Sri J. Vedamuthu, Vice-President, Standard Batteries Limited, Oldhams Division, Madras gave a brief account of the development of separators in lead acid battery industry.

Earlier Dr. N. V. Parthasaradhy, Scientist-in-charge, CECRI Madras Unit welcomed the gathering and introduced the trainees. Sri N. Karuppannan, Scientist, CECRI Unit and coordinator of the course proposed a vote of thanks.

After delivering lectures by CECRI scientists, the participants showed a lot of interest to improve the quality and maintain quality control in their manufacturing unit. They desired that CECRI should guide them in the choice of proper resin, sintering temperature, duration of sintering, etc. They wished to have more idea on the aspects such as lowering of electrical resistance; lowering of pore size; and improving mechanical strength.

After viewing the demonstrations conducted at the CECRI Unit, the participants showed interest to fabricate their own instruments for testing separators. The instruments fabricated and demonstrated are simple and easy to fabricate. They are : impact measurement equipment; puncture resistance test equipment; permeability measurement set up; instrument to look for pin holes and defects in separators.

The course consisted of six lectures and six hours of demonstration experiments.

Fourteen participants both from the battery manufacturers as well as users have attended the course. Dr. N. V. Parthasaradhy, Scientist-in-charge, CECRI Madras Unit distributed the certificates to the trainees at the end of the training programme.

The faculty included: Sri K. Dakshinamurthy, Sri S. Palanichamy, Sri N. Karuppannan, Dr. N. Venkatakrishnan, Sri M. Devasahayam, Dr. K. Janakiraman, Sri P. Lakshmanan and Sri B. Manivannan.

CECRI COURSE ON 'MAINTENANCE AND CARE OF LEAD ACID AND OTHER STORAGE BATTERIES'

A two day course on 'maintenance and care of lead acid and other storage batteries was conducted at CECRI Madras Unit on 24 and 25 September 1987.

Inaugurating the course Sri N. Sabapathy, Additional Director, Institute of Road Transport, Taramani, Madras observed that the major expense involved in the maintenance of buses owned by various transport corporation in Tamilnadu was mostly towards the purchase of tyres and batteries. He felt that if the life of the batteries is extended at least by two months by following proper maintenance procedures substantial savings could be achieved.

The course consisted of six lectures on different aspects of maintenance and testing of lead acid and other storage battery systems as under. Lead acid and other storage batteries — a basic idea of different types and construction — Major areas of applications and duty pattern-Charging of lead acid and other storage batteries for different applications — Maintenance and monitoring of lead acid batteries and factors affecting battery performance and life — Failure and defect analysis of lead acid and other storage batteries and — Testing procedures for batteries for different applications and design of simple test equipment. The lectures were followed by discussion on the subject. The discussion were mainly on battery maintenanc problem faced by individual organisations, covering the following topics 1 revival of sulphated batteries; 2. Corrosion of grids and posts of miner cap lamp battery; 3. failure of separator; 4. indigenous source for importe nickel cadmium batteries and 5. explosion of stationary cells. The practical experiements conducted focussed on the care and maintenance procedures to be adopted while the batteries are in service, were carried ou to study the performance of the battery. During the practicals, the part cipants inspected a few samples o worn out and defective batteries. Assembly of a few simple battery testin equipments was also carried out. A the end of the course the traines expressed their views that more aspect relating to problems in battery manufacture might have included.

US HI-TECH FOR MRL

The latest technology on advanc control and optimisation from the U is to be transferred to Madras Refin ries Ltd. (MRL).

A contract for this has been signe at Madras on Oct. 19 between Se point Inc. of the US and MRL. M D. W. Tidwell, President, represente Setpoint Inc., and Mr. V. R. Deendayalu, Chairman and Managing Dire tor, MRL.

MRL can use this technology other refineries also in associati with Engineers India Ltd. (EIL).

The cost of the project is about R 6 crores. This includes the forei exchange component of Rs. 4 crore Of this, about Rs. 3 crores will be pa to Setpoint Inc. for their services a the balance will be used for purcha of computer hardware required for t project.

The value of benefits that MRL w derive by way of improvement in t yield and energy conservation will about Rs. 3.94 crores a year.

Subsequent implementation of t technology in other refineries will sult in a foreign exchange saving the tune of Rs. 40 crores a year.

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SPOTLIGHT ON
Biotechnology & Life Sciences (Part 1)

THE IMPACT OF BIO-TECHNOLOGY ON THE THIRD WORLD'S AGRICULTURAL ECONOMY

The coming of high-fructose corn syrup (HFCS) also called isoglucose as a competitor to sugar on the international sugar market is the first example of the economic impact of biotechnology of developed countries on the agricultural economy of Third World countries. The first large scale use of immobilized enzymes was in making HFCS. It is produced at present only in the USA, Japan and Canada and competes directly with sugar. It has a significant price advantage over sugar as a result of improved product quality and labour savings, with the most important substitutions being in soft drinks and canning. This means that the source of raw material for sweetener is shifting from sugar to corn.

The USA is a major corn producer and exporter, it is also a sugar importer. The main impact of the substitution of HFCS for sugar is likely to fall on Caribbean, Central American countries, India and Indonesia that import oil and export sugar to pay their debts. Tax and trade policies are very important here. The economies of these sugar exporting countries may suffer due to loss of export market for sugar arising out of the innovative products from biotechnology.

Looking further in future, the guayule rubber developed by genetic engineering in USA may have a strong impact on the export market of natural rubber exporting countries such as Malaysia, Indonesia, Brazil, and others.

Another illustration of biotechnology's long term impact on poor country's agricultural economy is the Brazilian alcohol programme. In this agrochemical programme a major commitment was made by the Brazilian Government to develop alcohol and gasohol as alternative fuels to relieve dependence on costly imported fuels. Notwithstanding the recent drop in the price of petroleum, the Brazilian effort has much to recommend it. What Brazil has done is not necessarily at the forefront of genetic engineering. But the country has accumulated valuable industrial experience in the biomass ethanol field that will put it in an enviable position when petroleum prices again begins to rise, as inevitably they must. However, some of the Brazilian success has been accomplished by favouring the use of its best lands to grow an energy crop of sugarcane rather than food crops, like black beans and manioc that are eaten by poor people. This food-energy dilemma will be faced by many developing countries in future and may need careful balancing act.

NEW INSULIN MOLECULES DEVELOPED BY NOVO INDUSTRI BY COMPUTER-AIDED MOLECULAR MODELLING TECHNIQUES

Researchers at Novo Industri are claiming to have developed in collaboration with York University (UK), a new series of insulin molecules that will offer a more effective and convenient means to control blood sugar in the coming 3 to 5 years.

Using computer-aided molecular modelling techniques, Novo scientists have developed insulin molecules that can overcome the natural barrier of insulin delivery withou affecting potency or immunogeneticity. Results from the first human trials confirm that these properties have been conferred upon the molecules.

'The discovery of these new insulin molecules represents the most significant breakthrough in insulin research, since the original molecule was first isolated by Banting and Best in 1921' claims Ulrik Lassen, senior executive vice president of Novo Industri, Denmark. It represents the first commercially important use of protein engineering.

Key properties possessed by the new series include rapid activity and solubility. One set of molecules are absorbed much faster from the subcutaneous tissue after injection. This will mean that peak insulin serum levels will be attained within 15 to 30 mins. about 3-times faster than conventional treatment and closer to the natural secretion of healthy patients in response to meals.

Nova revealed the new molecules at the last June meeting of the American Diabetes Association in Indianapolis, USA.

Novo's current long-acting insulin preparations are soluble and should be easier to adminster, the company claims. After injection the insulin molecule crystallizes producing a protracted and very reproducible absorption profile. This series will mimic normal basic insulin levels with less variation than current prolonged acting crystalline preparations. In addition, the company plans to use this series with its Novopen delivery system. Lassen believes that the new molecules could fill a very important gap in the insulin erapy market. Novo is now plan-ing to pursue new therapeutic rategies with the new molecules as ell as using the combined com-uter and gene-splicing techniques develop other therapeutic mole-ules. (*ECN* 6/15/87 p. 21).

NEW PYRIDINIUM RESIN EVELOPED TO IMPROVE IELDS OF L-ASPARTIC ACID

Researchers at Kyoto University f Industrial Art & Textile have eveloped a method of immobilizing scherichia coli C-600 microorga-isms (used in production of L-spartic acid) by a new pyridinium ased resin.

The pyridinium resin developed by apanese researchers is a bridging oly-N-alkyl-4-vinylpyridinium halide, which has proved suitable for imm-olizing bacteria specifically acting n ammonium fumarate to produce -aspartic acid.

Researchers have successfully nproved upon the process for pro-lucing L-aspartic acid using the bove resin and microorganism. The new method is reported to produce -aspartic acid with a high yield of 40% -- rather high level yield -- a new landmark in commercial L-aspartic acid production. The esearchers expect to raise yield still urther by improving the activity of he immbolized microorganisms. (*Japan Chem. Wk.* 8/6/87 p. 5).

A BIOTECH PROCESS FOR COMMERCIAL PRODUCTION OF XYLOBIOSE UNDER DEVELOPMENT IN JAPAN

Xylobiose, a sugar of interest to food and pharmaceutical industry, will be produced in future commercially from wood waste, thanks to research by Japanese companies.

Three Japanese companies have jointly established technology on a pilot scale for producing Xylobiose sugar from Xylan (which is obtained from wood and composed, of B-1,4-linked Xylopyranose residues) by an enzyme oriented biotech process. The xylobiose sugar is produced by bonding two Xylose molecules by enzymatic action.

The three Japanese companies are Suntory, Shin-Nippon Chemical Industries Co. and Hitachi Zozen Corp. The former two isolated to heat-resistant Xylobiose-producing enzymes from Tricoderma SP and Humicola-SP fungi respectively. The latter enzyme was employed for refining purposes.

The Xylobiose-producing enzyme was fixed onto beads composed of an ion-exchange resin. It produced Xylobiose (72%), Xylose (15%) and Xylotriose (13%) from Xylan. The immobilized enzyme is far more efficient by several folds. When immobilized, the enzyme is capable of continuously producing Xylobiose for 250 hours at 40°C. The companies have a dynamic plan to develop bioreaction with the immobilized enzyme by 1989. This R & D will emphasize restriction of by-product like Xylose and Xylotriose and towards maintaining and even augmenting the enzymatic activity.

Xylobiose is looked upon as a promising humectant for goods, cosmetics and pharmaceuticals. In general water activity in foods and other products is closely related to the spoilage, discoloration and texture deterioration of the product. Therefore, edible salt or sugar has been added in the past so as to reduce water activity and thereby restrain propagation of microorganisms within the products. The water-activity reducing effect of xylobiose is nearly the same as glucose, but is higher than that of sucrose and maltose. Its sweetners equivalent is around 30% to that of sucrose. (*Japan Chem. Wk.* 7/23/87 p. 4).

A MARINE MICROORGANISM EFFECTIVE AGAINST CANCER MASS-CULTIVATED

Mitsubishi Chemical has successfully mass-cultivated a marine microorganism which its researchers cliam is 1,400 times as effective as the anti-cancer mitomycin, in-vitro. This breakthrough in cancer research was reported by Jardine Fleming's Tokyo analysts. (*Script* 8/12/87 p. 21).

GASOLINE & DIESEL FUEL PRODUCTION FROM MICRO-ALGAE UNDER ACTIVE STUDY

Microalgae are the future source of gasoline and diesel fuel. A different kind of oil field is promised under a programme of the U.S. Department of Energy's (DOE) Solar Energy Research Institute (Golden, Colo). Gasoline and diesel fuels could be produced from microalgae by 1989. SERI recently signed a $225,000 contract with Microbial Products Inc., (Fairfield, Calif.) to design fabricate and operate a microalgae outdoor test facility at Roswell, New Medico. The project is funded by the New Mexico Research & Development (Albuquerque). SERI plans to sign one or two more contracts in 1987 to convert algae oil into fuels. It is considering processes that employ trans-esterification or catalytic cracking.

SERI has collected about 3,000 algae strains and found 39 that produce up to 90 per cent of their dry weight as lipid oils, reports Donna Johnson, aquatic species programme coordinator. The biomass growth rate obtained in the laboratory is about 50 gm/m^2/d. SERI hopes to get similar results in the

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test facility, which will consist of a 1.25 acre pond for scale-up research and eight smaller ponds. This would translate to oil proction of 150-400 bbl/year/acre, depending on the length of the growing season. However, preliminary estimates show that gasoline derived from algae will cost about $1.60/gal, which will not make it economically feasible until about 2010 A.D. (*Chem. Eng.* 5/11/87 p. 19) and (*Chem. Eng.* 7/20/87 p. 10).

MICROBES WILL COME TO POWER IN THE 21ST CENTURY

Earlier microbe hunters Louis Pasteur and Joseph Lister depicted microbes as sinister enemies of mankind. In the last two to three decades biotechnology has shown that these creatures are more friendly and can actually be useful in thousand and one ways in food, agriculture, health-care etc. Other developments show that the electricity from microoganisms is enormous.

Prototype devices based on bioelectrochemical principles, such sensors and batteries, already exist. These devices depend on the ability of bacteria and other microorganisms, such as baker's yeast, to break down food by a process that generates a few of electrons which reacts with oxygen. This process is called respiration. More ambitious applications of bioelectrochemistry include devices to count cells in biological samples, batteries to turn fuels such as cane sugar directly in to electricity and biorectors that clean up industrial wastes.

Bioelectrochemistry combines two very potent disciplines. On the one hand microorganisms are extremely versatile biocatalysts capable of promoting spectacularly fast reactions. Electrochemistry, on the other hand, offers a fundamental efficient method to convert matter into energy, which does not necessarily need a high operating temperature. To add to these advantages, devices which combine the two methods are ideally suited for modern instruments and control. Now researchers want to use microbes in watches and cameras as power sources for the Third World and for reactors to turn industrial waste into electricity.

It is foreseen that in the 21st Century cars may run on microbial fuel cell. The energy from the complete oxidation of a monosaccharide like glucose or a disaccharide such as sucrose to carbon dioxide and water is 16 to 17 million joules per kilogram or 5 kilowatt hours of electrical energy -- enough to power a single-bar heater for 5 hours. This is just less than half the eergy that can be obtained from equivalent weights of fuels such as octane, but the efficiency of 'burning' carbohydrate in microbial fuel cells is potentially much greater than that of burning gasoline.

A medium-sized car could travel 25 to 30 Km on one Kg of a concentrated solution of a carbohydrate. So 50 litres of a saturated aqueous sugar solution would give the car a range of more than 1000 Km. Economically, sugar may prove to be a tough competitor to rechargeable batteries or solar cells, if efficient microbial fuel cells are developed in the coming century. The attraction of microbial fuel cells will depend largely on how new materials and cell designs can enhance their power to weight ratio.

Another most favourable prospect for the microbial fuel cell is towards 'scaling down' the technology to make batteries that deliver microwatts or even milliwatts of power. Carbohydrates in microbial cells have a high coulombic capacity of around 4 amperes per hour per kilogram, much higher than lead and zinc and not far short of lithium. This capacity is a direct consequence o the ability of organisms, which have many enzymes, to oxidise a fue completely in a succession of reactions. Less than 0.1 gm of carbohydrates would power for a year a watch that needs 100 microamps per hour (360 coulombs) of electricity. Microbial fuel batteries for electronic devices could rechange themselves by 'eating' when on an intermittent load. This may not require any extra fuel, since microorganisms may contain stores of food in a kind of 'bacterial camel's hump'. Alcaligenes eutrophus, for example, stores large quantities of carbohydrate as a polymer called polyhydroxybutyrate.

The development of large microbial fuel cell and bioelectro chemical reactors present problems to a range of technologies. Bioelectrochemistry will require a flexible approach to research, including inputs from other disciplines such as chemistry, physics, materials science and electronics. Fortunately the battery makers and effluent treaters have become more adventurous of late and have begun to move into modern biotechnology. (*New Sc.* 4/16/87 pp 36-39).

GENE TEST OF A GENETICALLY ALTERED BACTERIA ON A POTATO PLOT OKAYED BY EPA

The University of California announced last April that one of its researchers Steven Londow, is to undertake a controversial experiment that involves releasing a strain of genetically-altered bacteria into the environment.

The researchers detected a single gene from the bacterium, Pseudomonas syringae, to make it resistant to frost. The experiment is due to take place in the middle of 1987 on a half acre plot of potatoes at ulelake (California). The experi- ent has been sanctioned by the niversity, the State Government nd the EPA. (*New Sci.* 4/16/87 p.).

HE WORLD'S FIRST FACILITY O MANUFACTURE SYNTHETIC POSOMES PLANNED IN THE K

The British Department of Trade Industry gave recently an Ameri- an Company Genzyme of Boston, SA, a grant to help it to build a fac- ry in Britain to produce synthetic posomes. This will be the world's rst facility for producing synthetic posomes in bulk. The British grant ill be of Pound 4,000,000 to build Pound 4 million facility for synthe- c liposomes that can carry drugs in ne blood system to their target cells. enzyme's processes rely on nat- ral catalysts, enzymes. These nzymes increase the efficiency of ertain chemical processes com- ared with the current traditional nethods.

For instance, Genzyme will sep- rate chemical isotopes with nzymes. The result will be a pure orm of chemical for the pharmaceut- cal companies' chemical processes. *New Sci.* 4/16/87 p. 23).

SANDOZ LINKS UP WITH REPLIGEN

In a bid to develop its interests in iological pesticides, Sandoz is to orm a 60/40 joint venture with Rep- gen, the Cambridge, Massachusetts-based biotechnology oncern. The new venture, to be alled Repligen-Sandoz Research, vill focus on industrial enzymes and iological pesticides.

Under the terms of the deal, Sandoz will provide all funding for ne joint venture's research and product development while Repligen will supply the technology and adminstrative support. Sandoz will acquire about 2 per cent of Repligen's stock for about $2m.

While the joint venture will assume all rights to Repligen's lignin degrading and modifying enzymes and *Bacillus thuringiensis* technology, Sandoz will have gloabl rights to commercialize all products. Repligen will receive royalties.

The lignin degradation and modification enzymes technology will be part of the chemical effort and will be used to develop waste water treatment systems for pulp manufacturing. The biological pesticide research should, according to Hans Peter Schelling, Sandoz's director of crop research, complement the Swiss firm's own efforts. Currently, Sandoz has three agents based on *Bacillus thringiensis* strains on the market.

Biological pesticides are appealing because they are toxic to specific target species, capital production costs are low and they degrade within the environment. Ironically these attractions are also commercial weaknesses and sales of such products only command about 1 per cent of the $10bn global agrochemical market.

MERCK BIOTECH JOINT VENTURE

Merck Sharpe & Dohme, the US drugs concern, and Sigma Tau of Italy are negotiating an agreement to establish a 50/50 joint venture to conduct research into biotechnology. The deal is likely to involve the setting up of an Italian-based research facility with a start up cost of about L60bn ($45.5m).

Sigma Tau reported sales of L310bn last year and is targeting a L400bn turnover for this year. Merck's Italian operations reported sales of L260bn last year.

BIOTECH GUIDELINES FOR ANIMALS AND PLANTS

Proposed guidelines for research with genetically engineered whole plants and animals -- setting four biosafety containment levels consistent with those for microorganisms -- were adopted recently by the Recombinant DNA Advisory Committee (RAC) to the National Institutes of Health (NIH). If accepted by NIH Director James B. Wyngaarden, the guidelines will be enforced for all plant and animal experiments funded by the Agriculture Department. Since containment of large animals is not a great problem, "our concern was really for the containment of microorganisms" used as vectors to incorporate genetic changes in the animals, says Gerard J. McGarrity, President of Coriell Institute for Medical Reearch (Camden, N.J.), Chairman of RAC's *ad hoc* working group. Level-1, the least restrictive, allows open greenhouses for plants and fenced enclosures for animals. The Environmental Defense Fund had sought stricter containment. RAC referred to another *ad hoc* group a change proposed by Jeremy Rifkin, president of the Foundation on Economic Trends, to apply the U.S. guidelines more tightly to research abroad.

CYANAMID INVESTS

Cyanamid Benelux, the Belgian subsidiary of the US drugs group, is to plough BF173m. ($4.5m) into diagnostics research at IRE-Celltarg. Although the details of the venture were hammered out about two years ago the deal is only now being put into effect.

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IGHT EXTINCTION PARTICLE ENSORS

The Northey Division of K-M Interational Ltd. has introduced new igh resolution light extinction senors capable of measuring from 1 m for use with its range of particle ounting instruments. These senors have been developed in conjecon with Cambridge Consultants td., the leading British optical and echanical firm.

Using high precision micro-optics, -M International has achieved a .27 degree half angle of beam divrgence, which is a recognisable dvancement within the particle ounting industry, with a worst samling error of only + 2.7% about the ean. The sensor operates on the ell established light extinction priniple where the sample flows hrough a view volume between the wo windows of defined area.

A collimated light beam shines hrough the windows perpendicular o the flow and is detected by a phoodiode. The output of the photodide with no particles in suspension s known and controlled, and this output is reduced when a particle, passing across the window, obscures the beam.

The change in output from the photodiode is pre-amplified and transmitted to the particle counter for processing. The sensors are compatible with practically all liquids, and accuracy is unaffected by the colour and optical density of the sample. A micro-lens optical system collimates the light beam to a 1.27 degree half angle, resulting in the ultra high resolution.

The capability in particle monitoring extends from simple bottle sampling to on-line process control systems, with particle size and concentration measurement carried out by the K-M Northey DAC series of monitors.

The on-line sampler is designed for use with the DAC-5 monitor in continuous processes. It automatically regulates the flow through the sensor so that contamination levels can be measured in terms of unit volume. Metering accuracy is maintained over a wide range of system pressures, fluid temperatures and viscosities.

For large fluid flows an adjustable by-pass valve allows representative sampling. Fluid flow reversal, under control of the DAC-5, is used to clear blockages, should these occur during unmanned monitoring of a critical system.

The DAC-5 has five channels, each providing an independent particle size and count display. In addition, a continuous indepedent analogue signal is provided with each channel for strip-chart recorders.

The operator can set the channels independently to any particle size within the dynamic range of the sensor being used.

For interfacing with process control and other computer systems, an RS232C interface is available which slots into the DAC-5 unit. Software packages can be provided for a specific application. Particle count can be screen displayed.

For further information: K-M International Ltd., Swallofield, Welwyn Garden City, Hertfordshire, United Kingdom, AL7 1JP.

DAC-5 particle counter sensor

PORTABLE MEASURING PRINTERS

Kane-May Limited has used its 25 years of expertise in temperature measurement to break new ground with its KM1200 range of portable measuring printers. Much less expensive than portable chart recorders, they are self-contained, less costly, and easier to use than a data logger.

Success of the low cost flexible printer concept with its first model has now led the company to launch its new five model range, which introduces two more paramters, relative humidity and pH.

Characteristic of each model is an instant dated printout on a 45mm wide continuous strip roll integral with the unit. The data is printed out at a time interval of up to 60 minutes, set by the operator. Typical data might be time, day, pH, temperature and print time interval, and an average of results over a given period can be calculated.

Each unit has a touch sensitive keypad which emits a bleep during operation. Battery life can be up to 500 hours on standby, enough to print 1000 lines.

Rechargeable cells and a battery charger are available. The clock will remain accurate for at least 30 hours after the power is switched o or batteries are discharged o renewed. In addition, the unit wil remember previous set-up parameters when switched on. Each mode can also be mains operated.

The KM1201 temperature/millivolt printer

The one-channel KM1201 and the five-channel KM1202 have a temperature range of -100 to +1300°C The former can also measure an record millivolts, while the KM120 can measure differential temperatures.

Humidity and temperature measurement can be critical in the storage of food, grain or paper, or in the operation of some highly sensitive equipment such as computer o transmission areas.

The KM1203 will measure relative humidity (RH) from 20 to 80% an room temperature from 0 to 40°C. I has a fast response capacitive sensing element that can almost instantaneously detect small RH change that would otherwise be missed o mechanical thermohydrographs.

The K1205 measures not only p but temperature, and has a millivo input for combination oxidatio reduction (redox) or ion specific electrodes. A particular use is pH batc testing where a printed record i required.

The KM1201, 1202, 1203 an 1204 are all compatible with the K range of 40 standard temperatur probes. Each is available as a comprehensive kit in a carrying case.

For further details: Kane-May Lim ited, Swallowfield, Welwyn Garde City, Hertfordshire, United Kingdo AL7 1JP.

ERSATILE ELECTRO-HEMICAL CELL

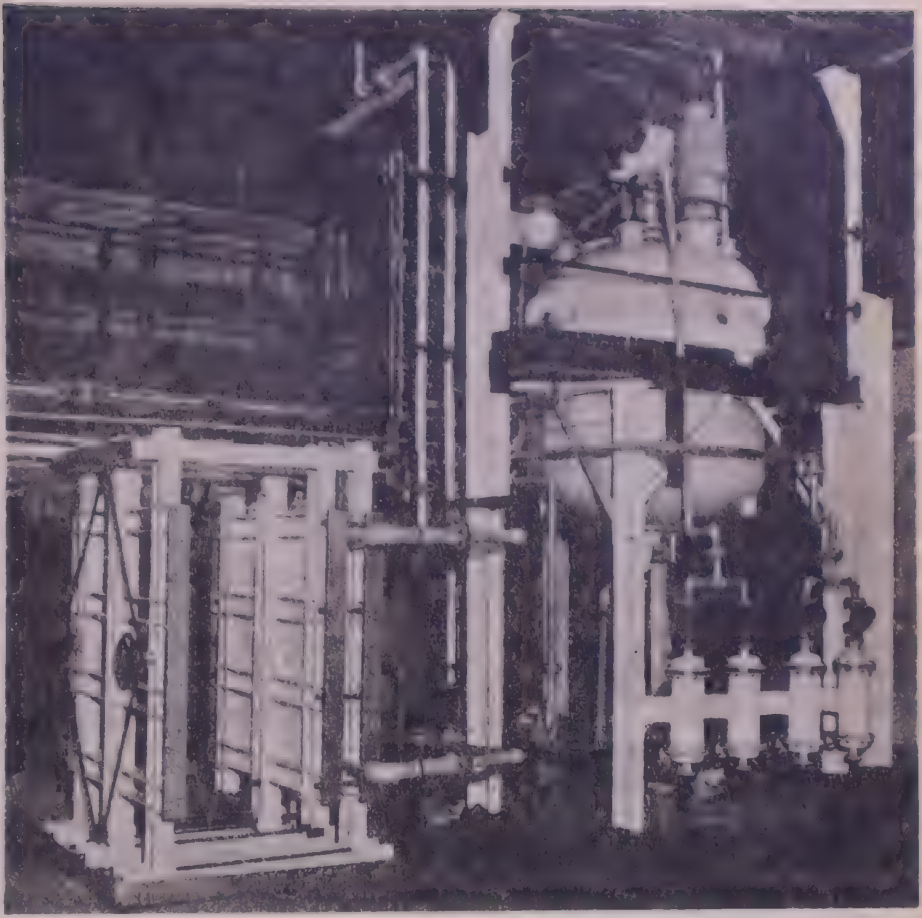
Hitherto the lack of suitable hard- are has limited the application of lectrochemistry to inorganic and metallurgical functions. Now, how- ver, Britain's Electricity Council has eveloped an electrochemical cell hat can be used for the synthesis of rganic compounds. It has been censed to Steetley Engineering Ltd., a subsidiary of Steetley PLC.

The advantages of the Dished Electrode Membrane cell (DEM) are ts narrow electrode gap and the high mass transport achieved. The narrow electrode gap, normally 4 mm on either side of the membrane for a divided cell and 4 mm between electrodes for an undivided one, educes the internal resistance of the cell and hence the voltage. (An undivided cell is one with no membrane and two electrodes, one dished and one flat). The dishing of the elec- rode allows a comparatively thick rame cell to be used which accommodates large electrolyte ports for connection to external manifolds. High electrolyte flow rates can easily be accommodated, and this is essential for the high transport conditions necessary for organic processes.

The use of a heavy gauge aluminium current distribution plate allows high current density capabilities and provides good current distribution across the face of the electrode.

Thereafter the flow of current is substantially normal to the electrode's working face and the voltage drop within it is a function of thickness only. A standard DEM cell can operate well at up to 500 Am^{-2}, and more specialised cells can be provided to work up to 10,000 Am^{-2}.

Steetley Chemicals has found that a single DEM cell, containing a Dozen individual cells, does the work of 12 of the previously used parallel plate cells, yet occupies the space of just one in its bromates manufacturing plant. In addition, a plant composed of DEM cells has fewer electrical connections.


The pilot plant DEM cell installation at Steetley Chemicals Ltd.

Because it is an enclosed system, there is less risk of spillage, and product contamination is avoided. It is also safer, because solids build-up in the electrode area is avoided, and quality checks can be made by taking one sample from a single cell instead of one from each. Finally, faster switching from the manufacture of one grade of product to another enables the company to match its output more closely to the demands of the market.

Many industrial processes were tested during the development stage, including the synthesis of organic materials, such as naphthaquinone, and inorganics such as hypochlorites, chlorates and bromates. The cell can be used to synthesise a wide range of chemicals, as well as products such as pharmaceuticals, dyestuffs and cosmetics. Its potential is such that more elegant, highly productive and less expensive routes can be created.

Proven material recovery processes with the DEM cell include the regeneration of chromic acid and other oxidants, and the recovery of caustic soda and acid from spent sulphates. Another advantage is the ease of scaling up from pilot to full production plant.

For further details: Steetley Engineering Ltd., P.O. Box No. 20, Bridge House, Gibbons Industrial Park, Dudley Road, Kingswinford, West Midlands, United Kingdom, DY6 8DA.

HIGH RANGE PRESSURE TRANSMITTER

Druck Limited has introduced the PTX180/W two-wire, 4 to 20 mA pressure transmitter. It has the capability of measuring fluid pressures compatible with 316 stainless steel and Hastelloy "C", and can be supplied to conform to National Association of Corrosion Engineers (NACE) requirements where hydrogen sulphide service is required.

It can be certified for use with barrier systems to the following European Community standards for hazardous areas: EEX ia Gas Group II C with a T4 rating at a T_{amb} = 80°C to BS5501 part 7 and Comite European de Normalisation Electrique (CENELEC) EN50020.

The device is designed so that the sensor is isolated from the pressure media by an isolating diaphragm of stainless steel or Hastelloy. This configuration gives a rugged, compact, high accuracy transmitter suitable for measurement of high pressures.

The PTX180/W has an operating pressure range spanning 13.5, 20, 35 and 70 MPa sealed gauge or absolute, although other pressure units can be specified. The transmitter has integral zero and span controls enabling precise zero and full range setting of the outputs.

Operating specifications include:

- Linearity and hysteresis + 0.1% for all ranges.
- Encapsulated electronics
- High overload (x 2) on all ranges (burst pressures greater than 135 mpa) is acceptable with negligible reduction in calibration setting.
- Good thermal stability +1% total error band -20 to +80°C.
- Transmitter supply voltage nine to 30 V dc.

For further details contact: Druck Ltd., Fir Tree Lane, Groby, Leicestershire, United Kingdom, LE6 OFH.

The PTX180/W two wire, 4 to 20 mA pressure transmitter

PORTABLE PROCESS INSTRUMENT CALIBRATORS

The Haven LM 540 is the latest addition to Haven Automation's range of portable process instrument calibrators. A microprocessor controlled, solid state PT-100 resistance temperature detector (RTD) measurement and simulation system, it provides a very high level of accuracy and operational flexibility for process, industrial and laboratory applications.

The Haven LM 540 microprocessor controlled, solid state PT-100 resistance temperature detector (RTD) measurement and simulation system.

The LM 540 simulator/tester calculates PT-100 values in degrees Celsius and Fahrenheit, and in ohms. It can automatically determine if two, three, or four wire systems are in use, show how many wires are connected, and indicate a loose wire or short circuit. The range is -230 to +850°C, corresponding to a range of five to 400 ohms.

The new Haven Procal Eclipse is a truly multi-functional process instrument calibrator, the only one of its type that can accept keyboard entry of resistance values, an operation that previously employed traditional methods using potentiometers. Other facilities include the measurement and generation of RTD signals, mV, mA, V and six thermocouple types.

Haven's Minical 2 hand held mA/mV calibrator is designed speci-

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A microprocessor controlled plug-in selector unit is used for all calibration and alarm setting operations. This selector unit allows calibration and alarm setting without opening the instrument, which is a major on-site benefit. It replaces the need for any specialist tools, and makes the instrument completely tamper-proof.

For further details contact: Draeger Limited, The Willows, Mark Road, Hemel Hempstead, Hertfordshire, United Kingdom, HP2 7BW.

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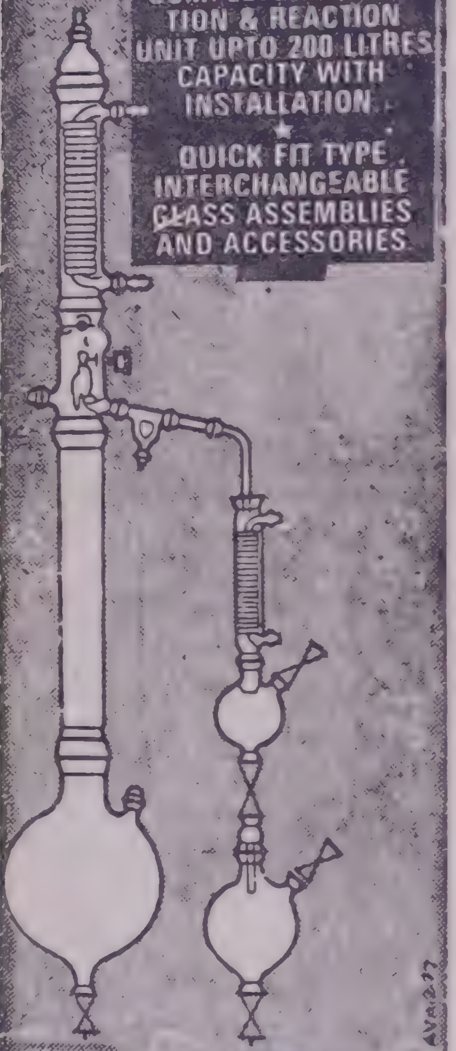

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Chemical News from Abroad

SM AND DU PONT TO ET UP ETHYLENE COPOLYMERS UNIT

DSM, the Dutch state-owned hemicals group ,and Du Pont f the US have agreed to set up Netherlands-based joint venure to manufacture ethylene coolymers for the European maret.

A final deal has yet to be signd, but the two companies plan o invest around Dfl. 100m $49m) in the company and will uild a production plant at DSM's omplex at Geleen, South Limbrg. Planned capacity has not een revealed, but the partners xpect the plant to be on stream y 1989.

According to Du Pont, the oint venture will combine DSM's "favourable ethylene position, its igh pressure autoclave knowow and manufacturing capabiliies with Du Pont's European arketing position and advanced echnology in copolymers."

The European ethylene copoymer market is currently around 50,000 ton/year and is growing y some 4 per cent annually. The products are used in a range f applications including packaing, inks and adhesives.

The new plant will make a ange of ethylene vinyl acetate esins under Du Pont's **Elvax** rademark, along with **Nucrel** cid copolymer resins. The **Elvax** products will be sold by he joint venture while the **Nu**rel resins will be sold to Du ont.

John Himes, director of Du ont's industrial polymers diviion, said: "This joint venture ill enable us to serve Europe's apidly expanding markets more ffectively and strengthen our ability to meet the demands of our growing ethylene copolymers businesses throughout the world." The company currently makes ethylene copolymers in the US and through a joint venture with Mitsui Petrochemicals in Japan.

In a related move, meanwhile, Du Pont says it is also planning to build a plant to make its Surlyn ionomer resins in South Limburg. No details have yet been announced, but it is likely that this plant will be built on or very near DSM's Geleen site.

BOC INKS CHINA GAS DEAL

After two years of detailed negotiations, BOC Group of the UK has agreed to set up an industrial gases joint venture in China with Shanghai-based Wusong Chemical Works.

The new company, Shanghai BOC, will be 50 per cent owned by BOC and is expected to begin operations late this year once formal approval has been given by the Shanghai municipal government.

BOC's initial investment is to be some $7m, but the new company will be capitalized at around $20m.

The deal marks an important step for BOC which has already pursued a policy of growth through joint ventures in Japan and, more recently, Turkey. According to the UK group, Shanghai BOC will be the first dedicated supplier of industrial gases to China's industry.

Shanghai BOC will continue to operate Wusong's existing gases business and will also start expanding by installing a 110 ton/day gas liquefier and building new facilities for special gas production — BOC Cryoplants will provide the liquefier which will be used for oxygen, nitrogen and argon.

BOC will also provide the joint venture with technology to improve production, distribution and marketing in addition to gas technology for the semi-conductor industry.

Commenting on the deal, BOC's chief executive Richard Giordano said: "We are delighted with this agreement. It is the first major joint venture between a chemical company serving mainland China and any foreign company, and will provide a very solid foundation for future growth not only of BOC's gases business, but also for BOC health care products and our other specialized technologies."

LUCKY IN MAJOR SUPPLY AGREEMENT

Korea's Lucky Ltd. has agreed a major sales-supply agreement to take product worth Aus$68m on an annual basis from the petrochemicals plant to be built by Petrochemical Industries Co. at Kwinana, Western Australia. The deal covers ethylene dichloride which Lucky will use to produce PVC in Korea. In total the deal, which runs for 10 years with a five-year option, could be worth around Aus$1bn ($1.4bn).

Construction of the plant will begin next year and completion is expected during 1991. The complex will use ethane feedstocks from the nearby North-West Shelf exploration project to produce a range of petrochemicals.

According to Petrochemical Industries, the company expects to find buyers for the whole of its planned production by the end of the year. A major customer is likely to be the aluminium industry which imports large quantities of caustic soda.

CHEVRON IN LINK WITH SUMITOMO

In a move to beef up its agrochemicals business, Chevron Chemical Co. has agreed to set up a US joint venture with Japan's Sumitomo to develop and market new products.

Financial details have not been revealed, but the two partners will own an equal share in the venture which will be based in San Francisco. New products will be produced at Chevron's plant at Richmond, California.

Reports suggest that the new unit will initially develop six new products, four from Sumitomo and two from Chevron. They include an insecticide for fruit, a fungicide for apples and cereals, and plant growth regulators.

For Chevron, the deal provides a boost to its own ageing agrochemicals portfolio. Two of its biggest sellers, the insecticides **Monitor** and **Orthene** have been around for 20 years, while the **Bolero** herbicide has been marketed since 1980. Observers say that Chevron is, at best, a "second or third division agrochemicals company" and estimate sales at $200m. It is not known whether the unit is profitable.

BP AND BAYER WIN EEC APPROVAL FOR PE DEAL

BP Chemicals, Bayer and their joint venture company Erdolchemie have won provisional EEC approval for plans to restructure their polyethylene businesses.

Under an agreement formally proposed in October last year, BP will replace Bayer as the distributor of Erdolchemie's production. This will end Bayer's role as an independent distributor of ldPE and make BP the joint eader — with Italy's Enichem — in the EEC ldPE/lldPE market with a 13 per cent share. The two parents will also build a new linear low-density polyethylene plant at Worringen to replace part of Erdolchemie's existing ldPE capacity.

The EEC has accepted that the deal will not disrupt competition within the European community and recognizes that it will contribute to improving the competitiveness of the parties involved. Final approval is expected next month and will be subject to the parties carrying out all the restructuring proposed in the deal. The commission will check on progress in 1991.

BP has declined to reveal the size of the new lldPE plant planned for Worringen, but it will be around 125,000 ton/year. It is due to come on stream in early 1991 and will use BP's low cost technology. Although there is no specific clause in the agreement, the commission understands that Erdolchemie will close one of its ldPE plants when the new unit begins production if a market review decides this is necessary.

Erdolchemie is currently a high-cost ldPE producer due to the limitations of its special autoclave reactors and the complexity of its production process. The EEC says that BP's technology will reduce these costs.

The deal is particularly important for Erdolchemie given the upsurge in demand for lldPE at the expense of ldPE. The main usage for both products — 67 per cent of output — is for packaging, but lldPE is superior in performance and is cheaper to make.

According to the commission, lldPE consumption in Western Europe rose from 320,000 ton to 440,000 ton between 1984 and 1985, and growth is predicted at 20 per cent/year. This will take lldPE demand above 1m ton by 1990. Producers who have installed or planning to install new lldPE capacity during 1986/87 include Atochem, Alcudia (now Repsol Quimica), BP, CdF Chimie, Dow, Enichem and DSM.

Low density polyethylene consumption, after enjoying rapid growth from 1970 to 1980 (from 2.7m ton 6.2m ton), is now predicted to increase at 1.5-2 per cent/year to 1990.

At present, there are 14 ldPE producers in the community. BP, with an 8.5 per cent market share, ranks joint number three. Erdolchemie has a 6.5 per cent share. There are five producers with shares between 8.5 per cent and 11 per cent.

Alongside the agreements on marketing and the new lldPE plant at Worringen, BP and Erdolchemie have concluded deals relating to technical services, product development, licensing and the exchange of confidential (presumably market) information.

The much discussed PE rationalization deal between BP and Enichem is likely to have moved forward a step following the approval of the plans for Erdolchemie. But sources in both companies suggest an agreement will be delayed while Enichem and Montedison continue discussions on asset reshuffling. The EEC is certain to pay close attention to any such deal between BP and Enichem given their combined clout in the marketplace.

CdF ACQUISITION

CDF Chimie is adding to its speciality chemicals portfolio with the acquisition of Societe des Bitumes Speciaux from the troubled Vallourec group. Terms are not revealed.

Societe Bitumes, with plants and R&D facilities in Gaillon-Aubevoye in Normandy, makes pe and thermal proofing coatgs as well as a range of corroon-resistant paints. It had pros of FF4m last year on sales of 130m ($21m).

CdF Chimie, the French statewned chemicals group, said the cquisition would allow it to prode a complete range of antirrosion systems based on polyers and thermoplastic componds.

MONTEDISON ISSUE

In the wake of its recent spening spree, including acquisiions valued at L2.6 trillion $1.97bn), Montedison has anounced a major capital increase. he Italian group is seeking to aise L1.028 trillion on the Italin and US markets, including arund L330bn through US depository receipts.

The move is aimed at reducng Montedison's massive debt, ut at L6.089 trillion at the half ear stage and since boosted by ts acquisition of Hercules' stake n Himont.

Shareholders will be asked to pprove the new equity increase n November 10 with the issue robably following in December.

COOKSON PAYS $74M FOR LAMINATES FIRM

Cookson, the UK-based speciality chemicals and materials group, has raised its profile in the electronics sector with the acquisition of the US firm, Polyclad Laminates for $74m.

Polyclad, with plants in New England and California, supplies epoxy-based laminates to the printed circuit board (PCB) industry. Along with its manufacture of multi-layer pressure bonded PCBs, Polyclad also uses electro-deposited copper foils which Cookson's Electrofoil subsidiary is developing for the European market.

Sales at Polyclad in 1986 were $80m, with pre-tax profit of $5m. This year turnover is expected to top $100m and pre-tax profits to rise above $10m.

Cookson, which has sales of £1.4bn, says that Polyclad's position at the top end of the PCB market should provide high margins. The new owner says Polyclad is a market leader in multi-layer products and is the largest independent US manufacturer of PCB laminates.

SOLVAY IN BID FOR AISCONDEL ?

The Belgian plastics and petro-chemical group, Solvay has strenuously denied rumours that it is seeking to take control of the UK speciality chemicals firm Laporte. Solvay currently holds a 22 per cent stake in the UK company and says it wants to raise this to 25 per cent.

Sources in Spain, meanwhile, believe Solvay may be discussing a takeover of Barcelona-based plastics raw material producer, Aiscondel which is jointly owned by Energia e Industrias Aragonesas and a Spanish bank. Neither company has commented on the rumours.

Separately, Solvay plans to raise a BF500m ($13m) loan to fund investments in France.

AIR LIQUIDE IN TAIWAN VENTURE

France's Air Liquide is continuing its Far East expansion with a new joint venture to produce industrial gases in Taiwan. It is setting up a new company in conjunction with Taiwan Far Eastern Textile and plans to build a production unit to supply the needs of the local electronic components industry.

The new plant will be built at Hsin Pu near Shinshu, but Air Liquide has not revealed the size of the planned investment or capacity. It will be designed and built by Air Liquide's Japanese subsidiary, Tisan Air Liquide, and the French industrial gases giant will take a majority stake in the new joint venture.

EEC REINSTATES UREA DUTIES

The EEC commission has re-established customs duties on urea imports from Mexico and the United Arab Emirates. Duty was reintroduced after the commission found that the countries had exceeded the individual ceiling on urea imports, currently fixed at Ecu 380,000 ($432,000).

It is also re-establishing duties on imports of the pesticide component hexachlorocyclohexane, from China under preferential tariff arrangement. Under this system, certain products are subject to a statistical surveillance every three months. If the commission deems that import levels threaten member countries it can re-impose duties. In the case of hexachlorocyclohexane, the reference base of Ecu 291,000 or 5 per cent of total imports, was exceeded by China.

Meanwhile, the commission is initiating anti-dumping proceedings on Spanish imports of choline chloride originating from Belgium. It received a complaint from Spain's sole producer, Productora General de Perfumeria that imports of the product, which is used as an animal feed additive, was causing injury to the Spanish industry.

The company alleges that choline chloride imports from Belgium have grown from zero in 1984 to 908,000 ton in 1986.

Chemical Markets Abroad

TIO$_2$ DOWNTURN PREDICTED AS CAPACITY HIKE CONTINUES

The Titanium dioxide market is tipping from bullish to bearish. Wall Street analyst Salomon Brothers says it is uneasy about prospects for the future of the titanium dioxide business.

Salomon calculates that the top eight titanium dioxide producers will expand capacity by 350,000 ton/year over the next three years. This is roughly 16 per cent, or 5 per cent annually, and excludes Du Pont's plans for three 60,000 ton/year plants, the second 36,000 ton/year phase of the Ishihara Singapore plant and the two joint ventures planned by Kerr-McGee.

Demand is forecast to rise annually by 2 per cent and by a higher figure in the Far East.

Salomon says that last year's 5-6 per cent increase in shipments included a significant level of stockbuilding. "The current tight supply/demand situation will turn to modest overcapacity by mid 1989, when much of the new capacity comes on stream," the report says.

Producers until recently were expressing heavily bullish sentiments, operating hand-to-mouth in a low-stock situation. Supply is still very tight and capacity utilization close to maximum. The world's largest producer, Du Pont talks of a similar 1.5-2.0 per cent annual demand growth for mature US and West European markets, 5 per cent in Brazil and 7 per cent elsewhere in Latin America and the Far East. But Du Pont calculates 2.0-2.5 per cent increase in supply — half the Salomon forecast of 5 per cent — to 1991. Producers also deny the report's suggestion that there was a significant build up of stocks last year.

The business is still very profitable. The UK market price now stands at £1,150-1,200/ton — almost 18 per cent above 1986 levels. The mainly West German-driven continental price is currently DM4,100-4,200/ton.

Critics attack the report's demand figures for under-estimating the contribution of Far East growth and question its supply figures for failing to account for closure of older capacity. There are also doubts about construction of new plants. Tioxide of the UK puts South Korean and Taiwanese demand at 10-15 per cent, and adds that growth is currently retarded by insufficient capacity.

Salomon's London office says higher oil prices and environment pressure will squeeze Tioxide's margins over the next year. It says the company's profit growth has depended on running older plants that have lower production costs than European competitors, "who have generally spent more on pollution control.

"Tioxide could face increasing pressure from the EEC commission and environmentalists to clean up the 90 per cent of its plant which uses the sulphate process," says the report. Tioxide acknowledges that it faces increasing environmental pressure, but points to huge sums invested in clean-up measures. International environment group Greenpeace unequivocally endorses the suggestion that Tioxide will have to adapt to stricter environmental demands, and plans to present its views at an Anglian water authority public inquiry in mid October on alleged pol-

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tion of the English river Hum er by a Tioxide plant.

Observers point out that future pacity projections take no ac ount of the fact that new plants ill be replacing older units for ed to close under environmen al pressure. For example, NL hemicals' new 40,000 ton/year lant in Varennes, Canada, is ex ected to replace the existing 6,000 ton/year sulphate plant here.

The Salomon report says that major contributor to high mar ins was the lower oil price. Es imates of the proportion of fuel osts in TiO_2 production vary rom 10 to 30 per cent depend ng on the process.

Both Du Pont in Geneva and anson Trust subsidiary SCM in ondon report a very tight mar et, although SCM foresees an easing between 1989 and 1990.

VAN OMMEREN TAKES ON CETECO

Van Ommeren, the Dutch shipping and storage group, is set to acquire Amsterdam-based trading company Ceteco, in a "friendly" tender offer valued at around Dfl. 208m ($100.3m).

Share trading in both companies was suspended on September 28 pending the announcement. Van Ommeren's share price at closing was Dfl. 34.20, with Ceteco's shares at Dfl. 230.

Van Ommeren said the tender offer comprises five of its own newly issued common shares plus Dfl. 100 in cash for each Ceteco share held. After the deal is finalized Van Ommeren will change its name to Van Ommeren Ceteco NV and the trading activities of the merged group will be managed by Ceteco's current management.

Both companies have been adversely affected by the weak dollar and slack shipping markets.

SULLOM VOE SUPPLY HALT BOOSTS PRICES

Corrosion problems at the BP-managed Sullom Voe oil and gas terminal in Scotland have halted LPG supply, and sent prices rocketing. Around 1,800 ton/day propane, and 1,400 ton/day of butane are being lost, producing an October shortfall of at least 60,000 ton. All stocks at Sullom have been exhausted, and no more product is leaving the terminal. Repairs to possibly widespread corrosion damage could take until the year-end.

Propane prices leapt from around $130/ton to $180/ton cif NWE for small lots, but fell back again to around $150-160/ton cif. Although buyers were forced to pay higher prices for early-October delivery, supplies from outside the North Sea will ease the situation for the remainder of the month, and prices could fall further. The shortfall is being made up by over 100,000 ton from Algeria, Kuwait and other sources.

Meanwhile, higher prices relative to naphtha are discouraging interest for propane by the petrochemicals industry. BP has announced $145/ton for propane and $157/ton for butane for the fourth quarter, from $105/ton and $120/ton respectively. Shell is still negotiating its prices.

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News from the American market

FOURTH-QUARTER PRICES BEGIN TO RISE

Producers have quickened the pace of price changes slated for Oct. 1. Celanese Chemical, a unit of Hoechst Celanese, raised the prices of more than 20 organic chemicals. Among the major changes: ethylene oxide, up 4 cent/lb; ethylene glycols, methyl, ethyl and 2-ethylhexyl acrylates, 3 cent/lb; ethyl and butyl acrylates, 2.5 cent/lb; propionic acid, diacetone alcohol and acetaldehyde, 2 cent/lb; methyl ethyl ketone and pentaerythritol, 1 cent/lb. Hercules matched the 1 cent/lb raise on pentaerythritol and raised tabs in Canada and Mexico 4 cent/lb. In other actions, Himont U.S.A. raised the price of polypropylene resins by 3 cent/lb; Union Carbide raised prices of ethylene-diamine by 10 cent/lb and aminoethanolamine by 7 cent/lb. Carbide also raised its tabs for vinyl acetate homopolymer by 1.5 cent/wet lb and vinyl acrylic copolymers by 2 cent/wet lb, effective Sept. 15.

A FERTILIZER UPTURN IS PREDICTED

Fertilizer prices are back to the cost of production and producers can look forward to further gradual improvement, according to speakers at the American Chemical Society's recent conference in New Orleans. Curtis Brummitt, assistant to the manager at the Tennessee Valley Authority's National Fertilizer Development Center (Muscle Shoals, Ala.), says U.S. fertilizer consumption may have fallen in fiscal 1987, but a wave of consolidations has put the industry in better shape. Grain companies, Brummit adds, will increase their role in the fertilizer business because of their strong distribution systems. Kenneth F. Nyiri, market research manager at Texasgulf Chemicals (Raleigh, N. C.), says that "U.S. domestic phosphate demand will stagnate in 1988, but grow at 2-3%/year afterward." U.S. phosphate exports, Nyiri continues, will drop from 48% of the world total this year to 40% in 1992, but physical volume will remain steady because world phosphate trade will rise 20%, to 11.4 million m.t., in 1992.

SHRINKING SULFUR STOCKS ARE FORECAST

The world's sulfur inventories will shrink to 4.5 million metric tons, or about 7% of world sulfur requirements by the end of 1993, says Harold L. Fike, president of the Sulphur Institute (Washington, D. C.). That forecast is based on the assumption that sulfur production will grow less than 1 million m.t./year, while demand, primarily to make phosphate fertilizer, will grow faster. By 1993, Fike says, demand will reach 64 million m.t. while supply will come to 61 million m.t., up about 6 million m.t. from 1986. About 2.8 million m.t. of the increase, Fike adds, will be recovered sulfur from Mideast and Soviet sources. Phosphate fertilizer demand, Fike notes, is stagnant in the U.S. and Western Europe, but will grow 4% per year in Asia and Africa, 2.5 per cent per year in Latin America and Eastern Europe.

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SODIUM CHLORATE PANSION STARTS UP

Quenord, Canadian subsidiary Sweden's Kema-Nord, has arted up a major expansion of s sodium chlorate plant at Maog, Que. The move raises the ant's capacity to 92,000 metc tons/year, nearly three times s 32,000-m.t./year total in early 981, and according to Quenord, akes it the largest in the world. se of sodium chlorate has been owing in the pulp and paper dustry because it produces brint pulp with less fiber degraation and fewer effluent probms than when elemental chlone is used. In another action n sodium chlorate, Alby-Olin et a new delivered list price of odium chlorate crystal at $340/on in the North and $360/ton in e South, and posted a price of 355/ton f.o.b. McIntosh, Ala., r solution sodium chlorate.

HE FORECAST IS BULLISH OR PLASTIC ALLOYS

World consumption of plastic lends and alloys will grow 9-0%/year during the next 10 ears, says R. M. Kossoff & Asociates (New York City), a conulting firm. The company pegs vorldwide consumption in 1996 at 3.1 billion lb, compared with 1.3 billion lb in 1986. The largest factor in the projected growth is the automotive sector, with the new materials replacing metals in such large body parts as doors and body panels, and continuing to make headway in smaller parts. Other markets expected to contribute to growth include barrier packaging and electronic parts. The market is being bombarded, says Kossoff, by an "explosion" of new polymers.

AIR PRODUCTS GEARS UP FOR POLYAMINES

Air Products and Chemicals is retrofitting excess capacity in its alkylamines plant at St. Gabriel, La., to make 20 million lb/year of polyamines, with completion scheduled for mid-1988. Using a patented proprietary catalyst, the company will make diethylene-triamine, triethylenetetramine, and higher-molecular-weight ethyleneamines from feedstocks based on ethylene oxide. Air Products says the new process has cost advantages over the traditional one based on ethylene dichloride. Francis X. Sorg, business area manager for amines at Air Products, puts growth for the products at 1.5 times that of the U.S. gross national product, and says the company alreday has contracts for about half the output of the new unit.

FERRUZZI BUYS CENTRAL SOYA

Shamrock Capital, a limited partnership led by the Roy Disney family's Shamrock Holdings, has agreed to sell its $1.5 billion/year Central Soya Co. (Fort Wayne, Ind.) to the Ferruzzi Group (Ravenna, Italy). The transaction, which transfers all the equity in Central Soya, will cost Ferruzzi about $365 million — $170 million for the stock, plus assuming subordinated long-term debt of about $195 million held by Drexel Burnham Lambert, which engineered Shamrock's buyout of Central Soya two years ago. David H. Swanson, president and chief executive of Central Soya, says that the acquisition will give Central Soya an opportunity to expand its business and speed up development of new soya products. Ferruzzi, in addition to being a major commodity trading company and a leading European processor of corn, soyabeans and sugar, with sales of close to $8 billion/year, owns nearly 45% of $11 billion/year Montedison.

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In the European Market

Naphtha prices have moved up slightly to $156-161/ton and appear steady. Prompt availability is on the tight side especially from the Baltic, but shipments are expected from the Middle East in the coming weeks. Demand has been sluggish.

Ethylene prices are firm and steady at $495-505/ton cif NWE. Demand remains strong, and various plant shutdowns are keeping supply tight. Prompt availability has dried up. Producers are proposing a new contract price over DM800/ton.

Propylene prices have steadied after a long decline, and producers are seeking DM500/ton. Closures at a number of European derivatives plants has suppressed demand, but imminent start-up, together with some shipments to the US, and some ethylene plant problems in Europe, is adding some bullishness to the market. CNP at Sines, Portugal, is reported to be having problems with its cracker as is Shell in Moerdijk, the Netherlands. The overall surplus of propylene coupled with poor demand, in contrast with the tight ethylene situation, could make a switch from naphtha feedstocks to propane logical for the fourth quarter, although propane prices are high relative to naphtha.

Benzene prices at $265-275 ton have recovered by $5-10/ton partly in response to closure of hydrodealkylation plants. Shell in the Netherlands, is down for maintenance in the second half of October. Supply is quite long, although some traders are sitting on product bought earlier at higher prices. Contracts have settled at DM520/ton, which relates to 95 cent/gallon in the US for October.

Most spot toluene deals have been done at $200-203/ton this week, although East European material has changed hands at $195/ton. Low contrast numbers of $195/ton and DM380/ton could put spot prices under pressure, widening the margin with benzene, and thereby encouraging restart of HDA activity.

Spot orthoxylene prices are steady at $275-285/ton, underpinned by some Far East demand. Fourth quarter contract prices have settled at DM520/ton, led by Deutsche Shell and BASF of West Germany.

Paraxylene prices are steady at $310-320/ton, but trade is thin and supply long. US producers are trying to push posted prices back to 17.5-18.5 cents/pound for October, compared with 16 cents/pound for spot.

Styrene prices are firm and steady at $1200-1250/ton fob for T2 and $1,115-1,140/ton cif NWE for T1. Prices are high relative to benzene, but there is still no sign of deterioration. European producers are proposing an unchanged fourth quarter contract price at DM-2,300/ton.

Methanol prices are steady and unchanged from last week's levels at $125-130/ton fob for T2, and $107-110/ton cif NWE for T1. Fourth quarter contracts are expected to settle unchanged at $230-235/ton fob.

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News About New Projects

USSR PLANS TEN NEW ETHYLENE-BASED COMPLEXES

The Soviet Union plans to build 10 new ethylene-based chemical complexes within the next 5-10 years, close to raw material resources, Vladimir Yevsikov, head of the planning commission at the ministry of the chemical industry said.

The plan, Yevsikov emphasized, is still being developed and the locations are being selected. Most of the projects will be based on ethane and will include ethylene crackers of around 300,000 ton/year capacity. There will be some naphtha-based crackers, however, in order to obtain propylene.

The most advanced is a project in the Caspian Depression which would be fed on ethane from the Tengiz sour gas project. Construction is expected to begin at the end of this five-year plan, which finishes in 1990.

Another complex will receive its feed from the vast oil and gas fields near Urengoi in north western Siberia. Here, Yevsikov said, the complex could be fed either on ethane or naphtha. The exact location of the Urengoi complex has not yet been selected but it could be in the northern part of the country, in the Surgut or Tyumen region. Another ethane-based complex is planned for Central Asia and a fourth near the Pechorsk basin, in the Komi autonomous region.

The Soviet Union already operates some ethane-based ethylene-based ethylene plants in the 100-200,000 ton/year capacity range, based on its own technology. It could, however, seek foreign assistance for larger capacity units, particularly if construction time is a major consideration. Some companies have already been asked whether they would be interested in assisting with the complex near the Caspian Sea.

Speaking to the press at the Khimia-87 fair in Moscow, Yevsikov observed that the Soviet chemical sector has developed faster than industry as a whole. In some sectors, such as fertilizers, it is the world's leading producer, but in other sectors the industry is still underdeveloped.

Production of plastics, for example, is currently running at around 5m ton/year and by 1990 it is intended to raise this to 7m ton/year, a figure which Yevsikov pointed out, could in fact be raised higher still.

"Our economy needs polymers. With **Perestroika** (reconstruction) the chemical industry will grow faster than plant initially envisaged, but this will depend on resources, finance and cooperation with other countries," he said investment by the year 2000 will at least double.

From 1988 all the enterprises and research and development organizations currently under the wing of the ministry of the chemical industry will be on a self accounting system. Half way through the current 12th plan it is already evident that the target is being over fulfilled. This year the chemical industry is growing by nearly 7 per cent and in 1988 growth is expected to be higher still.

Primary attention will continue to be given to polymers and chemical fibres. Although the Soviet Union is a major producer of cotton and wool, chemical fibres will continue to develop quickly to satisfy the needs for textiles.

ICI TO BUILD COMPOSITES PLANT

ICI is to spend over DM25m ($13.8m) on the first continental European production plant for its wholly-owned subsidiary, Fiberite, a major supplier of advanced materials to the aerospace industry.

The plant will make continuous fibre-reinforced composites. It will be located at Oestringen, West Germany, where ICI already has a big manufacturing operation.

The Fiberite investment is in line with ICI's strategy to expand the worldwide activities of its advanced materials group. Fiberite is one of the world's leaders in prepregging — the impregnation of woven and tape products with high performance resins — with production facilities in the US and UK and a joint venture with Mitsubishi Chemicals in Japan.

The company believes the European composite market will grow at about 20 per cent/year and the plant will help meet this increased demand. At Oestringen, the plant will make woven and unidirectional tape products from epoxy, bismaleimide and other thermoset resins reinforced with carbon, aramid and glass fibres.

Fiberite's product range goes into key components in various aeroplanes and also has applications in space.

As well as supplying American aircraft/space programmes, Fiberite is advancing its products in European qualification programmes for Airbus, ATR 42/72, F50/100 and others.

The new plant should be on [illegible]eam by the beginning of 1989 and will nitially employ 50 people in production and technical services

It will be operated by Fiberite Europe GmbH, the European organisation of Fiberite USA, based in Monchengladbach, West Germany.

BP INCHES AHEAD WITH llDPE INVESTMENT

BP Chemicals has sanctioned funds to progress a proposed investment at Grangemouth for the production of higher alpha-olefin linear low density polyethylene (lldPE) copolymers using the BP Chemicals gas phase process.

This will enable detailed engineering design to be completed and long lead items to be ordered, the company says. The proposal will be developed as rapidly as possible to enable full authorization for the project to be sought in early 1988.

The new 125,000 ton/year plant will replace the former BXL 90,000 ton/year ldPE plant. Higher alpha-olefin lldPE copolymers utilize 4-methylpentene-1 (4MP-1) which will be produced by the recently-commissioned plant at Grangemouth.

BP Chemicals has been operating a 100,000 ton/year gas phase plant at its site in Lavera, France since early 1986 and has sold seven licences worldwide. A further investment in Germany is under active consideration by the 50-50 BP-Bayer joint venture EC Erdolchemie.

KATALISTIKS BUILDS NEW U.S. PLANT

Katalistiks International, a subsidiary of Union Carbide Corp, has acquired land in Savannah, Georgia, from CSX Transportation of Jacksonville, Florida, and intends to set up a facility for the manufacture of its next generation fluid cracking catalysts. The plant will be based on Katalistik's zeolite technology.

The company's existing plant in Savannah is one of the world's largest, with a rated capacity of 40,000-60,000 ton/year depending on product mix. The plant was modernized last year when process and shipping operations were upgraded.

Katalistiks is a major supplier of fluid cracking catalysts, catalyst supports and molecular sieves to world markets. It operates manufacturing facilities in Savannah, Delfzijl, the Netherlands, and research centres in Baltimore and Leiderdorp, the Netherlands.

KTI WINS DM200M ROW ETHYLENE REVAMP CONTRACT

The Dutch Engineering contractor KTI, now part of the Mannesmann group of West Germany, has won a DM200m ($110 m) contract to replace the hot section of an ethylene cracker belonging to Theinische Olefinwerke (ROW), the BASF-Shell petrochemical joint venture, according to industry sources.

Won against competition from from Lummus, the contract covers the installation of six new furnaces within the G4 (gas plant 4) cracker at Wesseling. Work is already in full swing and completion is due within two years.

The plant will be the first of its kind in as much as it will use Shell's new hydrowax cracking technology and include features which will allow the company to meet West Germany's environmental regulations. It will, for example, be the only ethylene plant to include a denoxification unit for NOx control.

Total capacity of the G4 cracker is 230,000 ton/year of ethylene. Using the new technology the unit will also yield around 130,000 ton/year of propylene. Between 63-70 per cent of supplies will be purchased in Germany.

The West German contractor Linde has already completed construction of the cold section of the G4 cracker which means that it can now run using the old set of furnaces.

ROW at present operates the G6 ethylene plant only. Based on naphtha, heavy feedstock and LPG, the plant has a capacity of 440 000 ton/year. To supplement its requirements of 670 000 ton/year, ROW has been buying ethylene on the market. The product is used to feed 550 000 ton/year polyethylene capacity at Wesseling.

SCM TO EXPAND US TiO_2 PLANT

SCM Chemicals is to undertake an expansion programme at its titanium dioxide plant II at Ashtabula, Ohio, to incraese the capacity of the plant by 16,300 ton/year. The total cost of the project is estimated at $18m.

The programme, scheduled to be completed by October 1988, will raise the capacity of the Ashtabula plant II, which employs SCM Chemicals' chloride process, to 63,500 ton/year and will raise the company's US annual TiO_2 capacity to 212,000 ton.

Coupled with the previously-announced chloride process conversion and expansion to 70,000 ton/year of the company's titanium dioxide plant near Bunbury, Australia, and the recently-completed conversion and expansion of the plant in Stallingborough, Humberside, to 78,000 ton/year, this programme will increase SCM Chemicals' worldwide capacity to 391,000 ton/year by the end of 1988.

The company is the world's third largest producer of TiO_2, a key whitening ingredient in coatings, plastics and paper. In the US, SCM Chemicals also produces coloured pigments, fine particle silica and titanium tetrachloride.

In announcing the expansion, Sir Gordon White, chairman of Hanson Industries, SCM Chemicals' parent, said that the company will continue to commit its resources to businesses such as titanium dioxide, which promise strong profitability and good returns to its shareholders. "This expansion programme is responsive to the growing US demand for TiO$_2$ pigments and reaffirms SCM Chemicals' commitment to the US market," he said.

BASF LICENSES PP PROCESS TO TAIWAN

BASF has granted a licence for its gasphase Novolen polypropylene process to Yung Chia Chemical Industries Corp, an affiliated company of the Formosa Plastics group of Taiwan. Yung Chia will build a PP plant within its petrochemical complex at Kaohsiung in the southern part of Taiwan.

The new plant will have a capacity of 130,000 ton/year and begin production in 1989. BASF will carry out the basic engineering on the plant.

Yung Chia is already operating a 100,000 ton/year plant at the same site supplying PP for the manufacture of film, injection moulding and non-woven bags.

TECNIMONT WINS PP CONTRACT IN HUNGARY

Italy's Tecnimont has been awarded a contract to build a new 60,000 ton/year polypropylene plant Leninvaros in Hungary. The deal was arranged through the Hungarian state chemicals trading organisation, Chemokomplex and is valued at DM100m ($55m).

According to Tecnimont, a subsidiary of Montedison, the new plant will use Himont's **Spheripol** technology. The Italian company also claims the deal establishes Tecnimont as the leading PP plant builder ahead of the West German and Japanese competition.

No dates for construction or start up have been listed for the new facility which will be sited at the Tiszai Vegyi Kombinat complex at Leninvaros. The complex currently produces olefins, plastics, fertilizers and pigments.

Financing for the project is based on a baseback deal, a novel method for Eastern European companies to repay investment costs. The deal has been arranged by Citicorp and is backed by a pool of Italian banks.

Citilease, based in Brussels, will pay Tecnimont for its work and lease the plant to TVK for an undisclosed fixed period TVK, in turn, will make payments in production for the fixed period after which time the Hungarian unit will assume full ownership.

PETROCARBON WINS CYCLAR CONTRACT

UOP has confirmed that Costain Petrocarbon has been selected to construct a Cyclar process unit at the BP facility in Grangemouth, Scotland.

Jointly developed by BP and UOP and employing a selective zeolite catalyst, the **Cyclar** process converts liquefied petroleum gas into aromatics which are used as high-octane gasoline blending components or as petrochemical feedstock. The BP Grangemouth unit will process LPG derived frrom North Sea gas. The unit is the world's first commercial-scale **Cyclar** plant and is expected to commence operations in mid-1989.

POLAND PLANS MAJOR ETHYLENE EXPANSION

Poland is planning to build two major ethylene plants in the coming years in an effort to meet an estimated national requirement of 800-850,000 ton by the end of the century, according to the minister responsible for the chemical industry, Professor Edward Grzywa.

Speaking to the press at the Khimia-87 fair in Moscow, Grzywa said that during the next five-year plan (1991-1995) the country will build a 150-200,000 ton/year ethylene plant at Blachownia and in the period 1996-2000 a new 300,000 ton/year plant will be constructed at Plock.

The Polish official said that to build a new plant at Blachownia would require an investment of $120m, which the country can not afford. He is therefore looking for a second-hand ethylene plant.

The minister was interested in a cracker at Carrington, UK but was unable to buy it as part of the Shell-owned plant had already been dismantled. Grzywa said that Poland may succeed in buying such a unit from Czechoslovakia or the Soviet Union.

Poland's ethylene capacity is at present limited to a very small (28,000 ton/year) plant at Blachownia and 360,000 ton/year capacity at Plock.

Investments in the chemical industry during the current five-year plan will total Zl. 362bn ($1.3bn).

Other second-hand facilities of interest to the minister include a 30-40,000 ton/year carbon black plant. The facility should be ecologically safe and (depending on its likely environmental impact) would be set up at Gliwice.

Grzywa said that Poland is interested in building a new 200,000 ton/year styrene monomer plant at Oswiecim and a new 180,000 ton/year ethylbenzene unit at Blachownia in a joint venture partnership. The country could pay back in either styrene or polystyrene.

Other projects the minister outlined include an expansion of polypropylene capacity at Plock from 60,000 to 90,000 ton/year, a new-generation process ABS facility at Oswiecim, and expansion of polystyrene production.

In fibres, Poland is looking for a partner to expand polyester fibre capacity at Torun from 40,000 to 60,000 ton/year.

An extensive programme of fertilizer plant modernization is under way in Poland. Kedzierzyn has already been completed, but Tarnow, Wloclawek and Pulawy are being modernized. Poland is looking for a partner, the minister said, for the modernization of the urea plant at Pulawy. The project would involve energy reduction and lead to some capacity increase.

The partner would provide the technology and take part of the production. Pulawy also produces melamine.

Most of the recent problems faced by the sector have now been overcome and the Polish chemical industry is now working at the pre-economic crisis level, Crzywa said.

When asked about likely competition in world markets between Poland and the USSR in trying to dispose of sulphur (the USSR is currently in the process of building vast sour gas-based sulphur facilities), the minister said he hoped they will not compete in the same markets.

ARCO CONFIRMS MTBE PLANS

Arco chemical has confirmed that it will build a 420,000 ton/year methyl tertiary butyl ether (MTBE) plant at its Fos-sur-Mer site near Marseilles, France.

The unit is an extension of the company's propylene oxide (PO) and gasoline tertiary butyl alcohol (GTBA) plant currently under construction at the site. Earlier in the year, Arco denied speculation that it had made an error in deciding to concentrate on GTBA production at Fos, although it had considered converting the plant to MTBE.

It is understood that Arco is nearing a conclusion on which company will be awarded the contract to build the plant. Arco invited John Brown and Badger amongst other leading contractors to bid for its other MTBE plant at Botlek in the Netherlands. Construction is expected to begin soon with completion scheduled towards the end of 1988.

MTBE will be produced from the GTBA available at Fos and from methanol bought in from other sources. Arco says that the new unit will allow it to make differing quantities of GTBA, its proprietary gasoline additive, Oxinol and MTBE according to market requirements.

The Fos site is expected to produce 400,000 ton/year of GTBA and 180,000 ton/year of propylene oxide when the new combined unit there comes on stream next year.

When the Fos plant is fully operational, Arco's total European production capability for GTBA will be 880,000 ton/year. This figure includes the 370,000 ton/year Botlek plant due to start production in early 1988.

COSTAIN PROFITS DIP IN COMPETITIVE MARKET

The UK engineering and construction group Costain has reported higher turnover for the first six months of 1987 with sales climbing 13 per cent to £425m ($705m). Pretax profit, however, slid slightly from £21.9 m to 20.9m over the same period due to the continued downturn in the engineering and construction business. Improved profits were achieved in mining and housing and Costain's property division.

The group said that the international contracting market remains very competitive with less work and lower margins being industry-wide problems. Moves have been made to take the company into new areas and thereby reduce its dependence on this sector.

Improved performances were reported by Costain Petrocarbon and the UK building division. In Australia, Costain's 67 per cent-owned subsidiary saw a substantial advance in pretax operating profit from Aus$3.5m to Aus$12.6m ($9.2m), thanks partly to a marked turnaround in its construction operations.

Costain has just announced it has signed an agreement through a subsidiary, Wacker Oil Inc, in the US to buy Valero Producing Co for $20m. Valero is an oil and gas exploration, development and production firm.

Technological Scene Abroad

A NEW RAW MATERIAL FOR PHARMACEUTICALS

Asahi Glass Co. (AGC), Tokyo, a major fluorochemicals producer, has developed 3'dioxi-3' fluoroadenosine. The company plans to investigate the possibility of using the new adenosine as a raw material for pharmaceuticals, including anticancer, antiviral (AIDS) and malaria drugs. So far, **in vitro** testing indicates that the low concentration (0.1 microgram/cu cm) of the AGC fluoroadenosine prevents propagation of L-1200 mouse leukemia cells. Thus, says AGC, the fluoroadenosine is at least as effective as 5-fluorouracil, which has been known since the 1950s as an inhibitor of cancer cell DNA synthesis. AGC is trying to finish the evaluation of fluoroadenosine's physiological effectiveness within a year or two, anticipating safety testing two or three years from now.

A LONGER-ACTING TPA HEADS FOR CLINICAL TRIALS

Integrated Genetics (Framingham, Mass.) says that it has developed a longer-lasting form of tissue plasminogen activator (TPA), a naturally occurring human protein that is highly effective in dissolving blood clots in heart attack patients. Clinical trial of TPA could begin as early as next year, says Integrated Genetics. Using protein engineering techniques, scientists at the company produced TPA by removing a glycosylatin site present in the molecular structure of the natural material, which resulted in a 10-fold increase in the length of time that TPA remains active in the bloodstream. Using this new form, it should be possible to administer the drug in lower doses and in a single injection, rather than in continuous intravenous solution. Longer-acting TPA also should avoid side effects common in patients treated with natural TPA: reocclusion or reclotting.

FINDING TWO DISEASES WITH ONE BLOOD TEST

To detect the antibodies to HIV (the agent that causes AIDS) and HTLV-1 (the agent associated with adult T-cell leukemia and lymphoma) in blood now requires two separate tests. But Eastman Kodak (Rochester, N.Y.) and Cellular Products (Buffalo) say they will soon be filing for Food and Drug Administration approval to begin clinical studies of a new test that can simultaneously detect both HIV and HTLV-1. If it is approved, Cellular Products, which developed the test and has applied for a patent, would manufacture the test system; Kodak would market it as part of its "business relationship with biotechnology company Cetus (Emeryville, Calif.).

INDUSTRY AND ACADEMIA JOIN IN A POLYMER CONSORTIUM

Several polymer research scientists from both industry and academia have formed a consortium aimed at stimulating the development of research tools that will reduce the time needed to develop and test new polymer materials. Charter members of the advisory board for the consortium, which met for the first time recently at the 194th American Chemical Society meeting in New Orleans, include representatives from Goodyear Tire & Rubber, Du Pont, 3M, General Electric, Eastman Kodak, Allied-Signal, the California Institute of Technology and BioDesign, a company specializing in computer-aided molecular design software. The consortium will provide a roundtable forum on the direction and scope of polymer research, says BioDesign. In addition, it will help define the scope and features that advanced design tools, including software programmes, must have to be useful in polymer research.

A CLEANER ROUTE TO ULTRAMARINE BLUE

A zeolite specialist at the Georgia Institute of Technology (Atlanta) has developed a way to synthesize the pigment ultramarine blue that avoids the generation of high levels of pollutants characteristic of existing processes. Research scientist Rosemarie Szostak of Georgia Tech's Energy and Materials Sciences Laboratory has produced the pigment by impregnating the pores of a white zeolite material with sulfur. Synthesis takes place relatively quickly, at low temperatures, reducing energy costs as well as unwanted sulfur byproducts. A bonus: The material "requires less additional processing time than any synthetic material made to date," Szostak says. Georgia Tech is now patenting the technology and attempting to license it to a large company, which will fund work to refine the process. Ultramarine blue, which is not now manufactured commercially in the U.S., is used in paints, food colouring, cosmetics, inks, rubber, plastics, oil and soaps, and as an agent to whiten paints, paper pulp and plastics.

Environment

NO WAY OUT FOR POLLUTERS

Companies that have violated environmental regulations won't find refuge in petitions for protection under Chapter 11, according to a decision handed down last month by a U.S. Bankruptcy Court. A Chapter 11 petition by Mattiace Industries (Glen Cove, N. Y.) was dismissed by the court on the grounds that the presence of hazardous waste at the company's site, continues to violate state and federal environmental laws, increasing cleanup costs and further diminishing the firm's assets.

The ruling shows, says the New York State Attorney General's office, which brought a motion in June for dismissal of the company's chapter 11 petition, that bankruptcy court may be a faster method for prosecuting some polluters than action under the Resource Conservation and Recovery Act (RCRA). Christopher VanCantfort, an environmental scientist with the New York State Dept. of Law and an expert witness in the case, says some companies operating "on the fringes of the chemical industry -- both ethically and financially" — may view Chapter 11 as a way to avoid penalties for environmental violations while continuing to operate. Mattiace Industries, he points out, has been fee to operate under Chapter 11 since May 1986 when that protection was granted.

In the June motion, State Attorney General Robert Abrams sought either dismissal of bankruptcy protection or conversion to Chapter 7, whereby a court-appointed trustees would liquidate Mattiace's assets. Assistant Attorney General Louise Halper, who prosecuted the case, found no previous cases in which a company was entirely dismissed from Chapter II protection on the basis of harming the environment.

Violations

Among the violations noted in Parente's decision were high concentrations of volatile organic compounds in groundwater, soil and surface water because of a lack of adequate disposal methods. In court, the state estimated that it would cost more than $1 million to clean up the site.

The owners of Mattiace Industries, Louis J., William and Otto Mattiace, operated a number of different chemical businesses at the Glen Cove site for at least the past 15 years. Currently, Mattiace reformulates bulk solvents into retail products. In 1986, the company reported sales of $1 million; and for the first half of this year, $1.5 million. It also reported $3 million in debt.

Mattiace is still operating. But although company officials have not been available for comment, VanCantfort says the company is under intense pressure from creditors. "Dismissal literally throws them to the wolves," he says.

Approval

The court's decision has won approval from several quarters. Robert D. Shockey, president of the Chemical Producers and Distributors Assn. (Washington, D.C.), calling environmental contamination a criminal act, states, "Chapter 11 has no bearing on the situation." Jane Bloom, senior attorney with the National Resources Defense Council (New York City), says that the decision sets "an excellent precedent that a company can't hide behind bankruptcy laws" to continue polluting."

Going through bankruptcy court to prosecute polluters could provide an alternative to regulatory agencies that can get delayed in hearings, VanCantfort says. "In less than eight weeks, we have a decision," he says, whereas various state and federal regulatory agencies, including the Environmental Protection Agency, had tried for two years to prosecute Mattiace. As VanCantfort sees it, the laws "don't provide a ready mechanism to put someone out of business" on the basis of causing environmental harm. The bankruptcy route, he says, "offered an opportunity to move very quickly against Mattiace."

MARINE TASK FORCE

Brussels has established a network of experts to deal with major marine pollution incidents. The task force will work under the general context of legislation on the exchange of information. This legislation originally covered oil products but has been extended to cover dangerous chemicals.

The task force, it is envisaged, will be on call at very short notice to offer expert advice at the scene of a major pollution incident. The EEC has the funds to finance the task force. As well as dealing with accidents within European waters the task force will be available to developing countries.

Biotechnology

WEST GERMAN FIRMS SET FOR GENE SPLICING ASSENT

Two West German companies are poised to receive key approvals from the federal health authorities for gene splicing projects. Hoechst is hoping to win approval for the first stage of its gene-spliced human insulin process while Boehringer Ingelheim is expecting to receive marketing approval for tissue plasminogen activator within the next few weeks.

Officials from the central commission for biological safety (ZKBS) are to look at Hoechst's plant The whole process for the production of gene-spliced human insulin can be split into three distinct sections: the fermentation step, a chemical purification of pro-insulin and a final step to convert the protein precursors to the insulin itself.

The ZKBS officials are expected to grant approval for the first phase involving the fermentation of gene-spliced bacteria and the associated killing of the micro-organisms. The other two phases are still to be investigated although the Hessian minister responsible has told his officials to press on with Hoechst's application for approval for the second phase.

Hoechst is unlikely to seek approval for the insultech (third) stage until the other two stages have been cleared. The West German company currently has a one to one pilot plant but expects to have an industrial scale plant with up to three times existing capacity once all test phases are complete.

The plant, according to Gerd Hobom of ZKBS, includes more safety provisions than required by the commission's rules. These rules only regulate state funded research products but private industry has committed itself to these rules until the federal government introduces its own specific regulations.

Total cost for the project is put at about DM70m. Behringwerke, the Hoechst subsidiary, is conducting clinical trials for the gene-spliced human insulin but the product is not a key component of the chemical giant's drugs portfolio.

Boehringer Ingellheim expects to get clearance to market tissue plasminogen activator, the blood clot busting drug, in West Germany. ZKBS has recommended that the BGA approve the drug which is made by Boehringer subsidiary, Thomae in Biberach under licence from Genentech.

FINNISH SUGAR FORMS BIOTECH JV

Finnish sugar, Finland's largest agro-food concern and La Cellulose Du Pin, the wood and paper branch of France's Saint-Gobain have set up a biotechnology joint venture, Biopulp International.

It has been established to develop and market enzymatic applications in wood processing and paper manufacture. The venture has received Eureka status for a research and development programme covering the degradation and modification of wood lignin. The estimated cost of the project is around FMk70m ($16m).

The two companies have already been involved in biotechnology for a number of years. Finnish sugar is one of the world's major suppliers of industrial enzymes, particularly celluloses for food processing. La Cellulose du Pin has been carrying out a research programme into the use of enzymes in wood and paper pulp processing.

DU PONT SUBMITS NDA

Du Pont Critical Care, the US marketing partner of Bio-Technology General, has submitted a new drug application to the US food and drug administration for the biotechnology concern's genespliced human growth hormone. FDA approval would allow Du Pont to start marketing the hormone.

Clinical data, according to BTG president Sim Fass, indicate that the new therapy is effective in stimulating growth in hormone deficient children. Moreover, Fass claims, the BTG products does not stimulate the immune system.

Other products currently available produce immune responses in patients. An Eli Lilly product produces the response in 7 per cent of patients with the Genentech product causing a response in about 30 per cent.

BLOOD CLOT DEAL

Sanofi and Transgene have signed a partnership deal to develop blood clot busting proteins using gene splicing techniques. The two firms are to form a joint venture, Sotragene, to produce and eventually market hirudin, a protein from leach saliva that inhibits blood clot formation.

Transgene will use its patented process to boost production of the genes of **Rhizobium Japonicum** to enhance nitrogen fixation properties when in close association with soya bean. Tests will probably be carried out for this project within 18 months.

BIOTECHNICA INTERNATIONAL DELAYS BUG FIELD TESTS

Monitoring problems have forced Biotechnical International to delay plans to field test gene-spliced bacteria. The tests are unlikely to be conducted until next spring although the company had originally planned to conduct the tests last May.

Researchers at the company and officials at the US environmental protection agency believe that monitoring techniques are not adequate enough. The planned tests, which were supposed to enhance alfalfa yields, will be conducted once Biotechnica submits a revised monitoring programme.

The company plans to test a strain of bacteria on a five-acre alfalfa field in Wisconsin. Earlier greenhouse tests demonstrated that the altered microbes raised alfalfa yields by 15 per cent. The regulatory bodies are willing to allow the tests to go ahead once a monitoring system is in place.

Biotechnica has developed a recombinant version of **Rhizobium** melioti, a nitrogen fixing soil bacterium that symbiotically associates with alfalfa. By tinkering with the genes, scientists at the US biotechnology firm have produced a strain that is better than the naturally occurring bacteria at fixing nitrogen.

The scientists planned to use a streptomycin-resistant strain to monitor the gene-spliced strain. This strain has been used many times before as a marker strain but unfortunately the field to be tested has a very high indigenous streptomycin-resistant population and so could not be used.

Biotechnica now claims to have solved the problem and plans to submit its new plans to the relevant regulatory bodies at the start of next month. "We hope to get approval to carry on by the end of the year," a company spokesman said.

Researchers at the biotechnology firm are also tinkering with the genes of Rhizobium japonicum to enhance nitrogen fixation properties when in close association with soya bean. Tests will probably be carried out for this project within 18 months.

BOCTS OPENS MULTI-PRODUCT UNIT

Moving away from the construction of dedicated facilities, Bocts has opened a £16.5m multi-product pharmaceuticals facility on its site in Crramlington, UK. Building was completed by the UK contractor John Brown Engineering and Constructors and the first products have now been commissioned.

At the moment three products can be made at the unit: flosequinan, heart drug in clinical trials in Europe and the US; the active ingredients of the rheumatoid arthritis treatment flurbiprofen; and a chemical biocide. So far the module has eight reactors on stream and the company plans to introduce a further three reactors at an early stage.

The plant is capable of making a range of products either in series or in parallel and can handle several 2,000 gallon batches of raw material at any one time, the company claims. The company hopes to expand capacity by introducing more modules as demand increases.

"The company is moving away from dedicated facilities as new compounds are both more complex and very active," Barrie Page, director of chemicals production, said. Production volumes are not as great so the market rationale for building dedicated plants no longer holds up.

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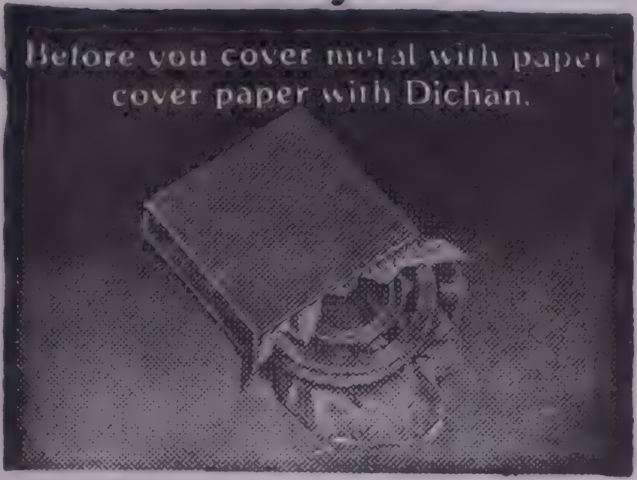

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Limited Moorat Trading

The traditional Moorat Trading was conspicous by its absence. Regular trading will commence after 28th of this month. Shortage of octanol resulted in increase in prices of plasticizers by Rs. 1 to Rs. 1.50 per kg. Phenol, MEK, formic acid and titanium dioxide continue to remain in short supply, though hopes of better availability in the new year is expected.

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Hyflosupercell	17+ST
Hexamine	29.00
Industrial Wax	25.00
Litharge	22.00
Lead Acetate (Tech.)	26.00
Lithopone	35.00
Magnesium chloride (crystal)	3.00
Menthol crystal (Flakes)	185 + Ex.+ST
Menthol bold	205 + Ex.+ST
Menthol crystal bold	245 + Ex.+ST
Magnesium carbonate (Japan)	16.00
Magnesium carbonate (Indian)	15.00
Maleic Anhydride (per kg.)	48.00
Mercury (75 lbs)	5,500.00
Nickel chloride	49.00
Oxalic acid	23.50
Peppermint oil (Rectified)	90 + Ex.+ST
Potassium carbonate (Indian)	19.00
Potassium carbonate (Imported)	21.00
Potassium bichromate	22.00
Potassium phosphate (Mono)	14.00
Potassium phosphate (DI)	14.00
Polyvinyl alcohol (No. 117)	88.00
Polyvinyl alcohol (No. 173)	90.00
Polyvinyl alcohol (No. 208)	89.00
Paraformaldehyde	15.30
Phthalic anhydride 96%	23.50
Pentaerythritol	63.50
Paraffin wax	13.75
Rangolite (German)	60.00
Rangolite (Czech.)	42.00
Sodium sulphate (Fine)	4.00
Sodium sulphate (Coarse)	3.80
Sodium sulphide 50-52% (Flakes)	8.25
Sodium sulphide 58-60% (Flakes)	9.25
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite	12.90
Sodium chloride 80% (Spain)	83.00
Sodium chlorite (50% span)	75.00
Santobrite (Indian)	36.00
Soda Ash (Tata)	3.85
Soda Ash (Birla)	3.50
Soda Ash (Imp.)	3.50
Sodium bicarbonate	5.50
Sodium bisulphite	4.50
Sodium silicate	3.00
Sodium acetate	6.40
Sodium alginate	160 + ST
Titanium Dioxide (Anatase)	53.00
Titanium Dioxide (Rutile — RCR$_2$)	68 + ST
Tartaric acid (Crystal)	94.00
Trisodium phosphate	4.80
Thiourea	64+ST
Urea (Tech.)	2.60
Vacuum salt	1.00
Zinc Dust	30.00
Zinc Oxide	28.00
Zinc chloride powder (technical)	14.00
Zinc sulphate	4.20

SOLVENTS	Per kg.
Acetic Acid (Glacial)	13.00
Acetic Anhydride	26.00
Acetone	20.50
Adipic Acid	50.00
Aceto Acetanilide	50.00
Aniline Oil	45.00
Benzoate Plasticiser	33.00
Butyl Acetate	42.00
Butyl stearate	36.00
Butyl Acrylate	63 + ST
Butanol	43.00
Benzyl chloride	24.00
Benzo trichloride	16.00
Benzoyl chloride	22.00
Benzyl Alcohol (FPC)	36.00
Bromine Liquid	45.00
Chloroform	24.50
Carbon Tetrachloride	10.75
Cyclohexanone	36.25
Cyclohexanol	44.00
Diacetone	30+ST
Diethylene glycol (DEG)	30+ST
Dioctyl Phthalate	47.50
Diallyl Phthalate	48.50
Dimethyl Phthalate	28.60
Dioctyl Adipate	52.00
Dibutyl Adipate	42.0
Dipentene	14.00
Dimethylamine 40%	12.00
Dimethylamine 60%	14.00
Ethyl Acetate	24.00
Ethyl Acrylate	46.00
Ethylene Dichloride	14.00
Ethylene Glycol	22.00
Formic Acid (Imp.)	30+ST
Formaldehyde	5.75
Glycerine (CP)	50.00
Glycerine (IW)	49.00
Hydrogen peroxide 50%	25.75
Iso Propyl Alcohol	18.50
Iso Butyl Alcohol	28.00
Monoethanolamine	46.50
Morpholine (Indian)	65.00
Melamine	36.00
Methyl Ethyl Ketone	38.00
Methyl Isobutyl Ketone	34.00
Methyl Acrylate	42.00
Methylene Dichloride	21.50
Meta Cresol	45.00
Nitrobenzene	16.50
Nitric Acid (Con.) (RCF)	2.60
Ortho Cresol	32.00
Phenol	38.00
Propylene Glycol	31.00
Polyethylene Glycol (No. 200)	36.00
Polythylene Glycol (No. 400)	37.00
Polyethylene Glycol (No. 600)	42.00

Anthraquinone Powder & Derivatives
Cyanuric Chloride Tin Chloride
Phthalic Anhydride Citric Acid

at Company's Competitive Prices

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3469/70/71, Raipur Kotni Rang, Opp. Makeriwad, Ahmedabad-380 001
Phones : 347412/347413 Resi. : 366836/366921 Grams : "ACETIC"
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COPPER SULPHATE IP
DRIED ALUMINIUM HYDROXIDE IP
MAGNESIUM HYDROXIDE POWDER IP
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PHERMONES
CARDIAC GLYCOSIDES
ANTI CANCER DRUGS

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RANGOLITE
POTASSIUM & SODIUM HYDROXIDE
OXALIC ACID
ESSENTIAL OILS AND
AROMATIC PRODUCTS

RUBBER CHEMICALS, CONVEYER BELTS, RUBBER PROCESSING AGENTS

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M/s. N. JIVANLAL & CO. PRIVATE LIMITED

Rawat Manzil, 2nd Floor, 60, Shamaldas Gandhi Marg, BOMBAY-400 002.
Tel: 251685/252527/253193 Tlx: 011-3865 Gram: NIRANJAN

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Polyethylene Glycol (No 1500)	44.00
Polyethylene Glycol (No. 4000)	38.00
Polyethylene Glycol (No. 6000)	50.00
Para Cresol	60.00
Styrene Monomer	31.00
Sorbitol	16.25
Trichloroethylene	24.50
Triethanolamine	41.00
Sulphuric Acid	2.10
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	11.75
Triethylamine	50 00
Vinyl Acetate Monomer	38.50
SOLVENTS	**Per Litre**
Benzene	8.90
N-Heptane	8.00
N-Hexane	8 75
Methanol	6.75
Solvent Naphtha Heavy	9.50
Solvent Naphtha Light	8.50
Toluene	10.30
Xylene	12.00
DYES INTERMEDIATES PRICES ARE WITHOUT TAX & EXCISE	Per Kg
Alphanaphthylamine	54.00
Aceto Acetic Ester (Methyl)	60.00
Alpha Naphthol (Imp.)	155.00
Ammonium Molybdate	170.00
Anthraquinone	80.00
Anthranilic Acid	63.00
2-Amino-4-Nitrophenol (Imp.)	140.00
Blue B. Base (Local)	235.00
Beta Naphthol (Atul)	58.00
Benzidine Dihydrochloride (BDH)	70.00
Bromamine Acid	400.00
BON Acid	108.00
Chicago Acid	275.00
C. Acid (Imp.)	260.00
Coach Acid	58.00
Cyanuric Chloride (Japan)	126.00
2, 4, DNCB	26.00
Dihydrothio PTCS (Imp.)	500.00
Dimethyl Aniline	53.00
Diethyl Aniline	135.00
Di-amino stilbene disulphonic Acid	115.00
3, 3-DCB (Imp.)	155.00
Gamma Acid (Atul)	160.00
H. Acid (Atul)	150.00
G. Salt	56.00
Isophthalic Acid	39.00
[illegible] Acid	265.00
J Acid Urea	260.00
K Acid	95.00
MCPS (German)	210.00
[illegible]	75.00
Meta Urido Aniline	135.00
MPD (Local)	122.00
MPD (German)	140.00
Naphthenic Acid	11.00
N-Methyl J. Acid	395.00
N-Methyl Aniline	145.00
Napthalene crude	13.60
Naphthalene (Refined)	20.00
Ortho Anisidine (OA Imp.)	85.00
Ortho Dichloro Benzene (ODCB)	10.00
OT Base	93.00
Para Dichloro Benzene (PDCB)	15.00
Para Anisidine (PA-Imp.)	110.00
Para Anisidine (PA-Local)	87.00
PNA	66.00
Para Cresidine (Imp.)	325.00
Para Amino Azo Benzene (India)	125.00
PNCB	26.00
Para Amino Acetanilide	140.00
1-Phenyl 3-methyl-5 Pyrazolone	110.00
Phenyl J. Acid	300.00
Para Amino Benzoic Acid	170.00
PT Base	88.00
Rhoduline Acid	425.00
Resorcinol	140.00
Resist Salt	18.00
Sodium Naphthionate	62.00
5-Sulpho-Anthranilic Acid	60.00
Sulpho Tobias Acid	95.00
Sulphanilic Acid	24.50
Trichloro Benzene (TCB)	15.00
Tobias Acid (Imp.)	108.00

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Phones: 252236-252256 • Telex: 011-3850
Factory: Nandesari, Dist. Baroda, Phones : 271-27

MART-AO-9/78

FOR YOUR REQUIREMENTS OF :

NAME	C. I. NUMBER
Acid Rhodamine B	Acid Red 52
Acid Green V	Acid Green 16
Acid Patent Blue AS	Acid Blue 7
Acid Patent Blue VS	Acid Blue 1
Acid Violet 4BS	Acid Violet 49
Acid Coomassi Blue FF	Acid Blue 15
Basic Victoria Blue B	Basic Blue 26
Basic Victoria Blue B BASE	Solvent Blue 4

Full Range of Direct, Reactive, Ramazole

Please Contact Manufacturers for Competitive Rates :

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Manufacturers & Exporters of Dyes, Chemicals & Dye Intermediates

Office : 312, Yogeshwar, 135/137, Kazi Sayed Street, 3rd Floor, Bombay-3.
Phones : 338770/345315, Resi. : 252296
Factory : 5 1 4, G.I.D.C. Phase-I, Vatva, Ahmedabad, Gujarat (India)
Phones : Factory : 393560 Tesi.: 441771/448188

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TRICHLORO ETHYLENE
(Original/Tech.)
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TARTARIC ACID
(Original/Recovered)

ACETONITRILE (Original)
ACRYLONITRILE (Original)
TRISODIUM PHOSPHATE
PARAFORMALDEHYDE 91%
PROPYLENE GLYCOL (Dow)
ACETONE (Original/Distilled)
D. E. G. (Original/Repack)
M. E. G. (Original/Repack)

OXALIC ACID (Substitute)
SORBITOL
METHANOL (Distilled)
SODIUM NITRATE
GLYOXAL — 40%
MALEIC ANHYDRIDE
TRI ETHYL AMINE
OCTANOL

Please Contact :

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FOR YOUR REQUIREMENTS OF :
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Bombay : 107, V. V. Chandan Street, 1st Floor, Vadgadi, Bombay-400 003.
Phone : 344339/322420 Cable BETA
Delhi : 10896, Mandir Road, Manakpura, Near Karol Bagh, New Delhi-110 005. Phone : 770433
Ahmedabad : 6, Uttra Apartments, Opp. Ajanta Commercial Centre, Near Navjiwan Press,
Ashram Road, Ahmedabad. (Guj.) Phone : 409953
Factory 5, Industrial Area, Maksi, Distt: Shajapur (M.P.) Phone : 78 & 79
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Bombay Dyes Markets

(Prices as on 20th October, 1987)

ACID COLOUR	Per Kg
Acid Violet 4BS	143.00
Acid Maroon V	110.00
Acid Orange II	77.80
Acid Orange IIY	63.05
Acid Red A	107.25
Crosein Scarlet MOG	155.00
Acid Scarlet 3R	99.90
Acid Red 38N	135.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Green V	330.00
Acid Patent Blue AS	250.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	121.95
Acid Black BX	98.40
Acid Black Wax	135.50
Procinil Yellow GS (I.C.I., UK)	265.00
Procinil Red GS (I.C.I., UK)	530.00
Procinil Blue RS (I.C.I., UK)	315.00
Procinil Scarlet G (I.C.I., UK)	600.00
Procinil Orange G (I.C.I., UK)	250.00
Procinil Rubine (I.C.I., UK)	550.00

DIRECT COLOURS	Per Kg
Yellow 3GX	88.10
Sun Yellow RCH	124.40
Fast Yellow GCH	141.15
Yellow CFG Hly. Conc.	312.00
Fast Yellow GS	111.65
Fast Yellow CHRS	95.45
Viscose Orange A	166.15
Fast Orange GR	133.75
Red	96.90
Dark Tan	78.25
Red IIR	72.55
Red 4B	169.10
Bordeaux BW	132.30
Fast Scarlet 4BS	166.55
Red 12B	170.55
Bordeux Hly Conc.	194.00
Cotton Red N	117.05
Brill. Fast Helio B	278.00
Brill. Fast Helio 2B	297.00
Brill. Fast Helio 2RS	136.20
Brill. Fast Helio BS	116.10
Brill. Violet Extra	126.40
Blue 2B	86.60
Blue G	170.50
Sky Blue FB	188.25
Copper Blue GR	147.00
Fast Greenish Blue GL	114.60
Developed Black BT	116.10
Blue NB-2B	300.20
Blue NB-2BC	185.30
Developed Black NB-BH5	185.30
Green B	111.65
Green NB-B	188.25
Green 2B-N	188.25
Brown MR	154.40
Brown CN	107.25
Golden Brown G	140.35
Catechin G	120.50
Omega Tan	126.40
Catechin GS	102.80
Black E Hly Conc.	142.60
Black E Extra Hly Conc.	142.60
Black NB-ER Hly. Conc.	310.50

DISPERSOL COLOURS	Per Kg
Yellow 6G Powder	143.80
Red B 3B Powder	247.80
Red B 2B Powder	323.20
Red CB Powder	439.15
Red D2B Powder	477.40
Violet C 4R	521.90
Blue BG Powder	235.45
Blue BN Powder	103.75
Blue D 2R Powder	476.25
Navy BT Powder	243.90
Blue B 2G Powder	210.20
Black BT Powder	182.60
Blue BR Powder	390.20
Yellow 7GL	338.60
Yellow 5RX	218.80
Yellow 3G	367.25
Yellow	140.00
Yellow AL	135.30
Yellow Brown REL	247.50
Yellow FFL	463.60
Gold Yellow GG	259.70
Pink REL	247.00
Red REL	468.65
Red 2B	327.40
Red FB	324.20
Red Violet FBL	469.85
Orange 3R	196.65
Violet 3R	280.60
Violet 6R	485.75
Violet RL	275.45
Scarlet RR	214.85
Rubine 3B	223.05
Rubine CB	364.90
Blue GL	318.95
Blue BGF	636.55
Navy Blue RE	270.40
Brown 3REL	200.40
Black GEL	324.20
Dark Brown 3B	317.40

BASE COLOURS	Per Kg.
Fast Yellow GC	80.20
Fast Orange GC	135.45
Fast Scarlet R	166.80
Fast Scarlet RC	126.65
Fast Scarlet RCR	99.05
Fast Scarlet G	121.65
Fast Scarlet GN	91.50
Fast Scarlet GG	72.70
Fast Scarlet GGS	72.70
Fast Red B	203.20
Fast Red RC	119.15
Fast Red R Flakes	149.25
Fast Red TR	166.80
Fast Red TR Oil	183.15
Fast Red RL	237.10
Fast Red KB Oil	201.95
Fast Bordeaux GP	201.95
Fast Garnet GBC	94.05
Fast Violet B	505.60
Fast Blue BB	521.45

NAPHTHOL COLOURS	Per Kg
ASG	217.00
AS	143.00
ASSW	279.75
ABBS	188.15
ASBO	195.65
ASD	175.60
ASOL	179.35
ASTR	279.75
ASPH	279.75
ASE	196.05
ASEI	184.40
ASLB	1632.60
ASBT	1817.00
ASWG	143.00
ASSG	397.70
ASSR	480.50

PROCION COLOURS	Per Kg
Golden Yellow HR	181.80
Brill. Yellow H 4G	117.55
Supra Yellow H-8GP	168.55
Brill. Yellow HE6G	166.95
Yellow H-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	243.95
Yellow M GR	326.05
Brill. Yellow M 4G	177.10
Brill. Yellow M 8G	332.30
Yellow M 3R	217 60
Brill. Orange H 2R	241.85
Brill. Orange M 2R	313.15
Brill. Red H 7B	157.95
Brill. Red H 8B	169.45
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.30
Brill. Red H-F3B	243.45
Brill. Magenta HB	167.00
Brill. Red M 5B	98.90
Brill. Red M 8B	173.70
Brill. Pink MB	137.10
Brill. Magenta MB	121.55
Brill. Purple H-3R	180.20
Brill. Purple H-7R	175.40
Navy Blue H 3R	298.50
Brill. Blue H-GR	366.55
Brill. Blue H 5G	173.10
Blue H 5R	283.85
Brill. Blue H 7G	178.70
Brill. Blue H 7RX	358.15
Turquoise HA	234.45
Supra Blue H-3RP	335.70
Supra Turquoise H 2GP	181.50
Blue H-ERD	305.80
Navy Blue H ER	258.60
Blue H 5RX	269.30
Navy Blue M 3R	310.95
Brill. Blue MR	331.70
Brill. Blue M RX	214.20
Brill. Blue M-G	382.30
Blue M 4GD	344.60
Navy Blue M RB	318.75
Turquoise M-G	197.85
Brill. Blue M GX	302.50
Blue 3R Acra Powder	718 20
Dark Brown H 6R	248.45
Cobalt Oxide (per kg)	285.00
Green H 4BD	269.80
Green H-E4Bl	169.80
Red Brown H 1F	143.25
Orange Brown H 2d	209.05
Brown M GRN	188.80
Black H-N	283.35

SULFUR COLOURS	Per Kg
Navy Blue	99 85
Green G	198.55
Black Grains Extra	63.05
Black Grains OG	64.55
Black GXE Conc	61.60
Black GXE	52.75
Black GXR	61.60
Black Grains 800	54.20
Black EXR Grains	64.55
Black EXR Grains 800	51.25

VAT COLOURS (ICI)	Per Kg
Yellow 5G Powder Fine	673.15
Yellow 5G Supra Disperse	439.30
Yellow 5G Acra Con.	628.75
Yellow 3R Powder	588.85
Gold Orange 3G Pdr. Fine	952.15
Brill. Orange 6R Pdr Fine	624.35
Gold Orange 3G Supra Disp.	570.30
Brill. Orange 6R Supra Disp.	601.30
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	997.80
Brill. Red 3B Supra Disc.	713.20
Brill. Purple 4R Conc Powder	470.75
Brill. Purple 3R Acra Powder	696.85
Brill. Purple 2R Hly Conc.	597.90
Brill. Purple 4R Supra Disp.	500.05
Brill. Purple 2R Acra Conc	625 95
Blue R Powder Fine	542.15
Blue BC Conc Pdr. Fine	522.50
Blue BC Acra Conc Pdr. Fine	762.70
Blue R Conc Pdr. Fine	577.65
Blue RR Supra Powder	629.35
Blue Conc Powder	645.80
Brill. Blue 2R Hly Conc	378 55
Brill Blue 2R Supra Disp	116.65
Dark Blue 2R Powder Fine	389.25
Blue BC Supra Disp	359.40
Jade Green XBN Powder Fine	438.20
Jade Green XBN Acra Conc. Pdr.	823.95
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Pdr. Fine	419.65
Jade Green 2G Ptg. Paste	125 40
Olive Green B Pdr. Fine	399 90
Olive Green B Supra Disp	308 25
Jade Green 2G Supra Disp	496.00
Jade Green XBN Supra Disp. (N)	327.30
Olive D Pdr. Fine	444.30
Olive OMW Pdr. Fine	698.55
Olive OMW Supra Disp	536.05
Olive R Pdr. Fine	422.95
Olive R Supra Disp.	363.90
Olive D Supra Disp	361.70
Olive D Ptg. Paste	193.00
Olive Green B Ptg. Paste	199.10
Olive Green B Acra Conc.	542.75
Olive R Acra Conc	640.00
Olive Green B Acra Conc	542.75
Brown R Pdr. Fine	835.00
Brown G Pdr. Fine	795.00
Brown R Pdr. Fine	659.75
Dark Brown 3R Pdr. Fine	685.00
Brown G Supra Disp.	449.90
Brown 2G Supra Disp.	554.00
Brown R Supra Disp.	422.95
Brown BR Powder	719.00
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	414.55
Brown G Acra Conc	733.95
Brown R Acra Conc	768.00
Grey M Powder Fine	763.80
Grey M Supra Disp.	585.45
Blue BC Acra Conc Pdr. Fine	762.70
Direct Black AC Pdr. Fine	474.70
Direct Black AC Supra Disp	330.35
Direct Black CH Supra Disp	393.20
Direct ACD Ptg. Paste	217.15

Bombay Drugs Market

(Prices as on 20th October 1987)

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such, they are not FIRM PRICES as between a buyer and a seller. The prices are published only with a view to giving some idea of market conditions.

Product	Rs. per kg.
Acetazolamide I.P.	700.00
Acriflavine BPC	800.00
Aluminium Hydroxide IP	21.00
Ampicillin Trihydrate	2,000.00
Aspirin IP	62.50
Barium Sulphate	19.90
Belladona Extract	74.50
Benzoic Acid IP	31.40
Caffeine Citrate IP	205.00
Caffeine IP	350.00
Calcium CMC	98.00
Calcium Gluconate IP	41.00
Calcium Glycerophosphate	141.00
Calcium Hypophosphate BPC	108.00
Calcium Phenthonate	450.00
Calomel BP	330.00
Cetrimide IP	215.00
Chloroquine Phosphate	500.00
Choline Chloride FG	33.00
Choline Chloride IP	70.00
Citric Acid IP	42.00
CMC Sodium HV	85.00
C. P. Maleate IP	945.00
Dapson IP	375.00
D. C. Citrate	235.00
Dexamethasone	75.00
Diastase (1:50)	58.00
Diazepam IP	615.00
Di Iodo Hydrin	335.00
Diloxanide Fumarate IP	400.00
Di Phenyl Hydrogen Citrate	198.00
Di Sodium Hydrogen Citrate	43.00
D-Panthenol Liquor	550.00
Ergomatrine Maleate	165.00
Ethambutol IP	650.00
Ferrous Fumarate	35.00
Folic Acid IP	4000.00
Furosemide IP	1,210.00
Furazolidone IP	360.00
Gentamycin Sulphate	9.20
Gum Acacia	57.00
Gum Acacia White	95.00
Gum Guar	16.00
Hematropine Methyl Bromide	9.25
Ibuprofen IP	345.00
I.N.H.	222.00
Inositol IP	560.00
Iodochloro	320.00
Iodoform NF	540.00
Lactose IP	28.00
Lactose Tech.	25.00
Lactic Acid	68.00
Lignocaine HCL	255.00
Lignocaine Base	255.00
L. Lycine Feed	135.00
L. Lycine Pharma	187.00
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Magnesium Hydroxide NF	20.50
Magnesium Hypophosphate	125.00
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Mannitol USP	64.00
Mercurochrome NF	270.00
Menthol	190.00
Metronidazole IP	415.00
M. P. S.	142.00
Niacinamide	143.00
Oil Mentha	80.00
Oxyphenbutazone	513.00
Papaine BPC	53.00
Paracetamol	97.00
Pectine IP	233.00
Pepsin 1:3000	450.00
Pheniramine Maleate	700.00
Phenyl Butazone USP	255.00
Potato Starch	65.00
Rifampicin IP	2,900.00
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Salbutamol Sulfate	8.25
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Sodium Salicylate	61.00
Sorbitol Powder	95.00
Sorbitol USP	17.25
Sulfacetamide	268.00
Sulphamethoxazole	415.00
Tinidazole	378.00
Trimethoprim IP	820.00
Vitamin A, Palmitate	2,650.00
Vitamin B_1 Hydrochloride	1,550.00
Vitamin B_1 Mononitrate	1,700.00
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Vitamin B_6 Hydrochloride	1,800.00
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Vitamin C Plain	238.00
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Yeast Powder	24.00
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Delhi Market

DELHI: OCTOBER 21 (NNS) — Moderate trading was noticed in the local chemicals market during past week on account of persistent offerings by stockists, says NNS. Market remained closed for two days for Diwali and Goverdhan Pooja.

Paraffin wax suffered a fall of Rs. 40 at Rs. 580 per 50 kg. owing to slack demand shown by candle manufacturers, as festival demand was at an end. Sodium nitrite also followed suit and suffered a fall of Rs. 20 owing to renewed offerings and sluggish enquiries. Camphor reacted downward by Rs. 1/2 at Rs. 89/98 per kg. on withdrawal of demand. Titanium dioxide Anatase softened by 50 paise at Rs. 50 per kg. due to nervous selling by stockists.

Mercury, on the other hand went up sharply by Rs. 400 at Rs. 7200 due to acute shortage of supply coupled with bullish advices from Bombay and sustained demand by local dealers. Menthol flake and boid went up by Rs. 10 each at Rs. 150 and Rs. 170 owing to good demand shown by consumers and fall in arrivals from U.P.

Formic acid eased by Rs. 1/2 per kg. for want of support. Pot. Nitrate flared up by Rs. 50 owing to reduced inflow while Pot. Permanganate declined by Rs. 100 at Rs. 2300 on comfortable stock position.

Turnover was poor in dyes and colours remained quiet and prices hovered around at their last week level.

(DELHI MARKET RATES AS ON OCTOBER 21, 1987)

Ammonia Bicarb (per 25 kg.)	130.00
Mercury (per fask)	7,200.00
Soda ash (per bag)	270-285.00
Ammonium Chloride (per 50 kg.)	110-180.00
Caustic Soda solid (per 50 kg.)	365.00
Caustic Soda flakes (per 50 kg.)	345.00
Citric acid (per 50 kg.)	2050-2150.00
Stable Bleaching Powder Shriram (per 25 kg.)	90.00
Stable Bleaching Powder KCI (per 25 kg.)	83.00
Stable Bleaching Powder MODI (per 25 kg.)	87.00
Sod. Bicarbonate (per 50 kg.)	250.00
Sod. Hydro Sulphite (per kg.)	31-35.00
Rangolite (per kg.)	37.50-38.50
Boric acid Technical (per 50 kg.)	980.00
Paraffin wax (per 50 kg.)	580.00
Tartaric acid (per 50 kg.)	6,300.00
Borax Granular (per 50 kg.)	520.00
Borax Crystal (per 50 kg.)	540.00
Sodium Nitrite (per 50 kg.)	660.00
Sodium Nitrate (per 50 kg.)	400.00
Camphor Thal (per kg.)	98.00
Camphor Powder (per kg.)	89.00
Menthol Bold (per kg.)	170.00
Menthol flakes (per kg.)	150.00
Menthol medium (per kg.)	160.00
Glycerine (per kg.)	45-55.00
Sodium Silicate (per quintal)	300.00
Hexamine (per kg.)	26.00
Acetic Acid Glacial (per kg.)	14.50-18.00
Copper Sulphate (per quintal)	1,500-1,800.00
Formic acid (per kg.)	30.00
Formaldehyde (per kg.)	6.00
Hydrogen Peroxide (per kg.)	30.00
Calcium Carbonate (per tonne)	2,500-4,000.00
Acid Slurry Soft (per kg.)	25.00
Acid Slurry Hard (per kg.)	32.00
Phosphoric Acid (per 50 kg.)	810.00
Pot. Nitrate (per quintal)	900-1,200.00
Pot. Permanganate (per 50 kg.)	2,300.00
Sod. Bichromate (per 50 kg.)	1,025-1,125.00
Tri-sod. Phosphate (per 50 kg.)	310-330.00
Titanium Dioxide Anatase (per kg.)	50.00
Titanium RC-822 (per kg.)	57.00
Zinc Oxide (per metric tonne)	28,500-32,500.00
Phenol Carbolic Acid (per kg.)	28.00
Carbon Tetrachloride (per kg.)	16.50
Chloroform (per kg.)	26.00
Sodium Sulphate (per m. tonne)	3,000-3,200.00
Naphthalene Balls (per 50 kg.)	1050.00

DYES & COLOUR	Per Kg
Naphthol AS	150.00
Naphthol ASG	235.00
Naphthol ASBS	200.00
Naphthol ASTR	302.00
Naphthol ASOL	191.00
Naphthol ASBO	208.00

DIRECT DYES	Per Kg
Black E. Conc.	92-150.00
Diazo Black B.T.	125.00
Green B.	115.00
Blue 2-B	86.00
Sky Blue FB	200.00
Basic Auramine 'O' Conc.	55-100.00
Basic Rhodamine B. 500%	220-300.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
Acid Orange	45-52.00

MATERIALS IMPORTED

BOMBAY
(From 19.10.87 To 23.10.87)
Cost of Imported Item is
CIF Value)

ABS MOULDING POWDER : From Japan : Nether Technical Training, Bangalore, 2,000 kgs., Rs. 99,338.

BIOCHEMICAL REAGENTS : From USA : Hindustan Lever Ltd., Rs. 1,944.

CABLE COMPOUND : From London : Asian Cables Corpn. Ltd., NA kgs., Rs. 150.

CHEMICALS : From West Germany : Industrial Perfumes Ltd., 5 kgs., Rs. 24,335; MB Resins and Plastics Ltd., kgs., NA ; Rs. 1,500.

DEXAMETHASONE : From France : IPCA Labs. P. Ltd., 3 kgs., Rs. 1,16,204.

DICYCLOMINE HCL : From Italy : Alcon Pharmls. P. Ltd., 100 kgs., Rs. 76,460.

DIPROPIONATE : From Portugal : Franco Indian Medicare P. Ltd., kg. NA; Rs. 96,837.

EPOXY RESIN POWDER : From Japan : Peico Electronics & Electricals Ltd., 1,350 kgs., Rs. 1,49,429.

GRAPHITE : From West Germany : Bradma of India Ltd., 8 kgs., Rs. 5,615.

LORAZEPAM : From Switzerland : Themis Chemicals Ltd., 5 kgs., Rs. 82,319.

PALLADIUM : From UK : Natural Perfumers Ltd., 100 kgs., Rs. 2,52,300.

POLYCARBONATE : From Netherland : Gandhi Indl. Corpn., 25 kgs., Rs. 500.

POLYVINYL CHLORIDE : From West Germany : Sarabhai Chemicals, Baroda, 500 kgs., Rs. 90,387.

RESIN : From USA : Automatic Elec. Ltd., 1,000 kgs., Rs. 12,612.

RUBBER CHEMICALS : From USA : Vako Seals, 20 kgs., Rs. 20,255.

SODIUM PHOSPHATE : From Spain : Laser Research Labs., 7 kgs., Rs. 4,15,752.

SYNTHETIC RUBBER : From UK : The Indian Cable Co. Ltd., Calcutta, 900 kgs., Rs. 1,18,887.

TRIPOLIDINE : From UK : Burroughs Wellcome Ltd., 50 kgs., Rs. 5,43,835.

MADRAS
(From 26.8.87 To 31.8.87)
Cost of Imported Item is
CIF Value)

AROMATIC CHEMICALS : From Singapore : B.V. Aswathiah & Bros., 100 kgs., Rs. 9,229; From FRG : S & S Products, Madras, 1,000 kgs., Rs. 25,178.

CITRONELLAL LINALYL ACETATE : From FRG : Padmini Products, Bangalore, 870 kgs., Rs. 1,04,493.

DIMETHYL OCTANOL : From USA : East West Perfumers, Bangalore, 717 kgs., Rs. 53,108.

LINALYL ACETATE : From Italy : N. Rangarao & Sons, Mysore, Rs. 14,241.

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SODIUM DICYANAMIDE : From Switzerland : IEL Ltd., Madras, 50 kgs., Rs. 14,888.

TARTARIC ACID : From Spain Bush Boake Allen (I) Ltd., 3,000 kgs., Rs. 1,06,521.

DRUGS. MATERIALS IMPORTED

BOMBAY
(From 19.10.87 To 23.10.87)
Cost of Imported Item is
CIF Value)

BENZATHINE PENICILLIN : From Mexico : Hindustan Antibiotics Ltd., 470 kgs., Rs. 3,54,393.

BIOCHEMICALS FOR MEDICAL USE : From USA : Hindustan Ciba Geigy Ltd., Rs. 16,451. M

BULK DRUGS : From China : Sopariwala Exports, 50 kgs., Rs. 34,861.

BULK DRUGS : From West Germany : Jet Pharmls. Ltd., 10 kgs., Rs. 23,740.

DEXPROMETHAZONE HYDROBROMIDE : From Switzerland : Oilymous Pharmls. P. Ltd., 5 kgs., Rs. 18,722.

LIFE SAVING DRUGS : From USA : Anil Shah, Rs. 2,699.

MEDICINES : From West Germany : Anil Gandhi, Pune, NA kgs., Rs. 413.

PHARMACEUTICALS & BULK DRUGS : From Belgium : Olympus Pharmls Enterprises, Ltd., 40 kgs., Rs. 2,78,890.

PIPERIDOLATE HCL : From Italy : Chemo Pharma Labs. Ltd., 13 kgs., Rs. 36,927.

TETANUS IMMUNE GLOBULIN : From Switzerland : Ayzachem P. Ltd., Pune, Rs. 3,92,189.

BAYER WASTE UNIT

Bayer Antwerp has started construction of a waste water treatment system on the left bank of the Schedule river in Antwerp The installation, similar to one already in use at Leverkusen, will cost BFr280m ($7.5m). Bayer Antwerp has in recent years spent about BFr1.65bn on environmental facilities accounting for approximately 10 per cent of total capital expenditure.

MONSANTO EXPANDS

Monsanto Malaysia is already considering a $25m expansion of production capacity at its plant at Pasir Gudang although the facility only came on stream three months ago.

Demand for the company's Roundup herbicide has trebled from 60,000 litres to 180,000 litres/month, and Monsanto Malaysia's managing director Chuah Ewe Tiek says the expansion may be required to keep pace with increasing demand.

He also says Monsanto Malaysia may start producing a wider range of herbicides as well as insecticides, fungicides and rodenticides.

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Company Notes

GANESH BENZOPLAST

Ganesh Benzoplast has completed 80 per cent of its project work and the commercial production is expected to commence by the end of November, 1987. The plant is expected to operate at full capactiy in a very short period.

According to company sources, test marketing of the products has already been done and it has received sales orders from actual users to cover entire production capacity of the year. According to Mr. Ramesh Pilani, director, looking to the good response from the market, the company is considering to expand its capacity three-fold and also make additions in the range of plasticisers.

METTUR CHEMICAL

The operation of The Mettur Chemical and industrial Corporation have been stabilised and this product is going to contribute significantly to margins in the current year, according to the chairman of the company. It also hopes to commission the refrigerant gases project in 1988, based on indigenous technology and at a low capital cost.

The company's wholly owned subsidiary, Metkem Silicon has run into some unexpected problems. While the plant has operated well, there has been poor offtake of polysilicon consequent on continued import of silicon wafers, with the result that the plant had to be shut down in the face of mounting stocks. However, these problems are being sorted out in discussion with concerned authorities. The company is also installing some downstream conversion equipment and it is hoped that 1988 would see this company turning out good results.

HICO PRODUCTS

Hico Products has earned a gross profit of Rs. 12.26 lakhs in the first six months ended June, 1987, compared to Rs. 6.44 lakhs in the same period of last year. After providing Rs. 72.48 lakhs (Rs. 70 lakhs) for depreciation and without any provision for taxation (same), there is a net loss of Rs. 60.22 lakhs as against the net loss of Rs. 63.56 lakhs in the same period of last year. For the whole of last year, the company earned a net profit of Rs. 5.82 lakhs.

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- Sodium Phosphate Anhydrous IP.
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- Di Ammonium Phosphate IP.
- Iron & Manganese Peptone.
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- Potassium Acid Tartrate/Cream of Tartrate IP.
- Sodium Benzoate IP.
- Sodium Citrate IP.
- Sodium Potassium Tartrate IP.
- Tetra Potassium Pyro-Phosphate Crystal IP.

- Choline Chloride IP.
- Choline Bitarte NF.
- Choline Bicarbonate
- Edetate Disodium USP.
- Ferric Pyro Phosphate Soluble/Insoluble.
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VOL. XXXIII NOVEMBER 10, 1987 NO. 9

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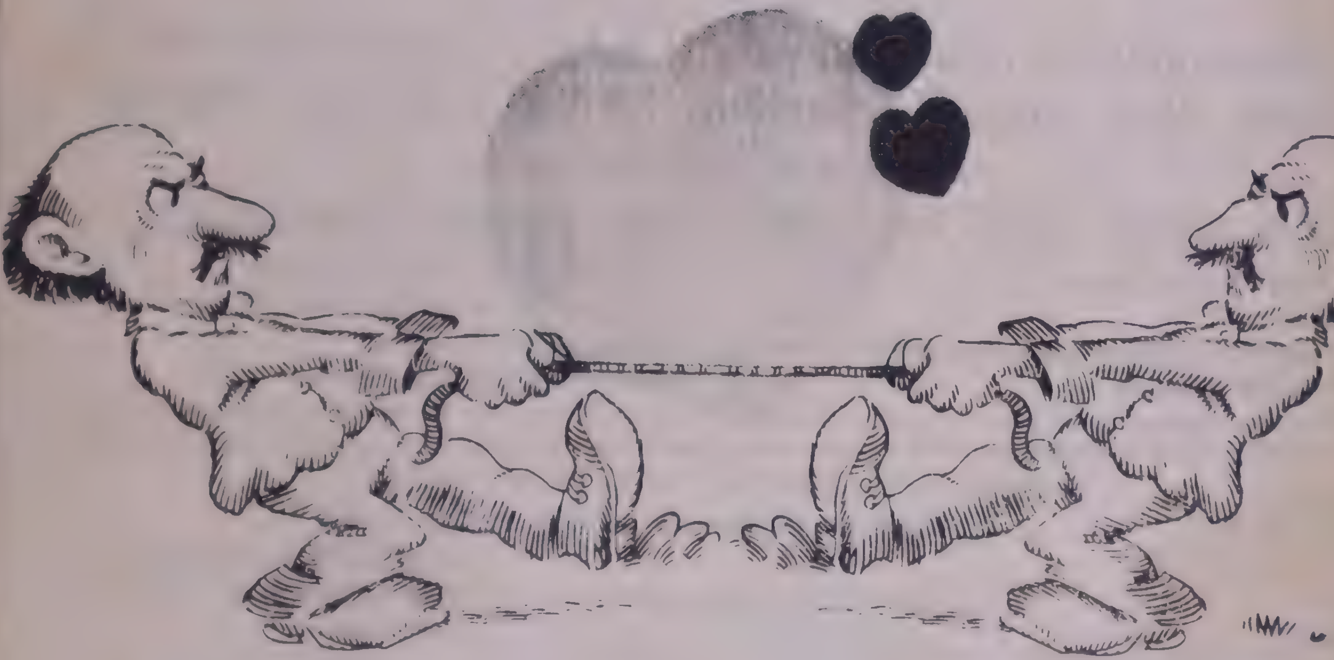

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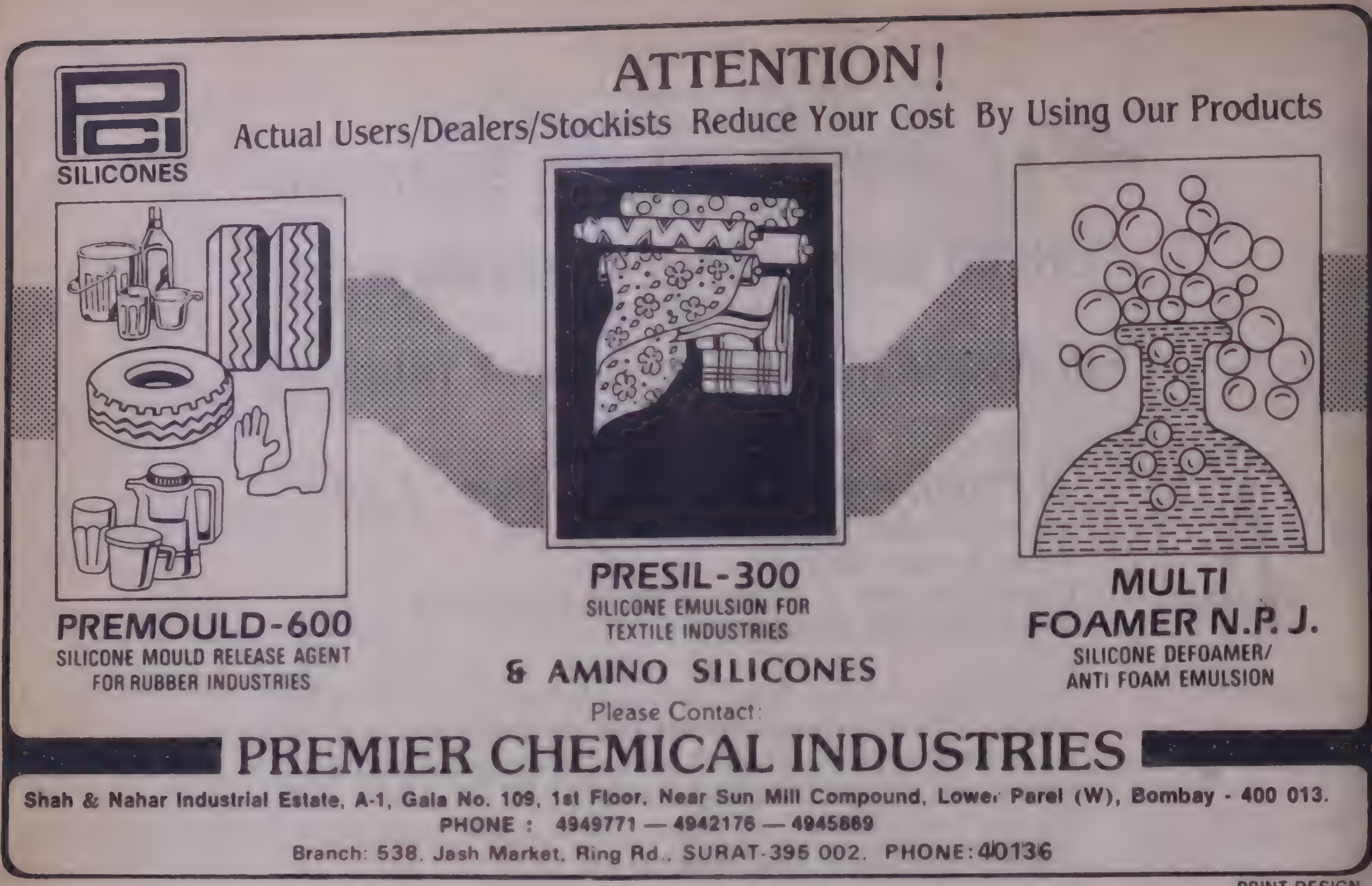

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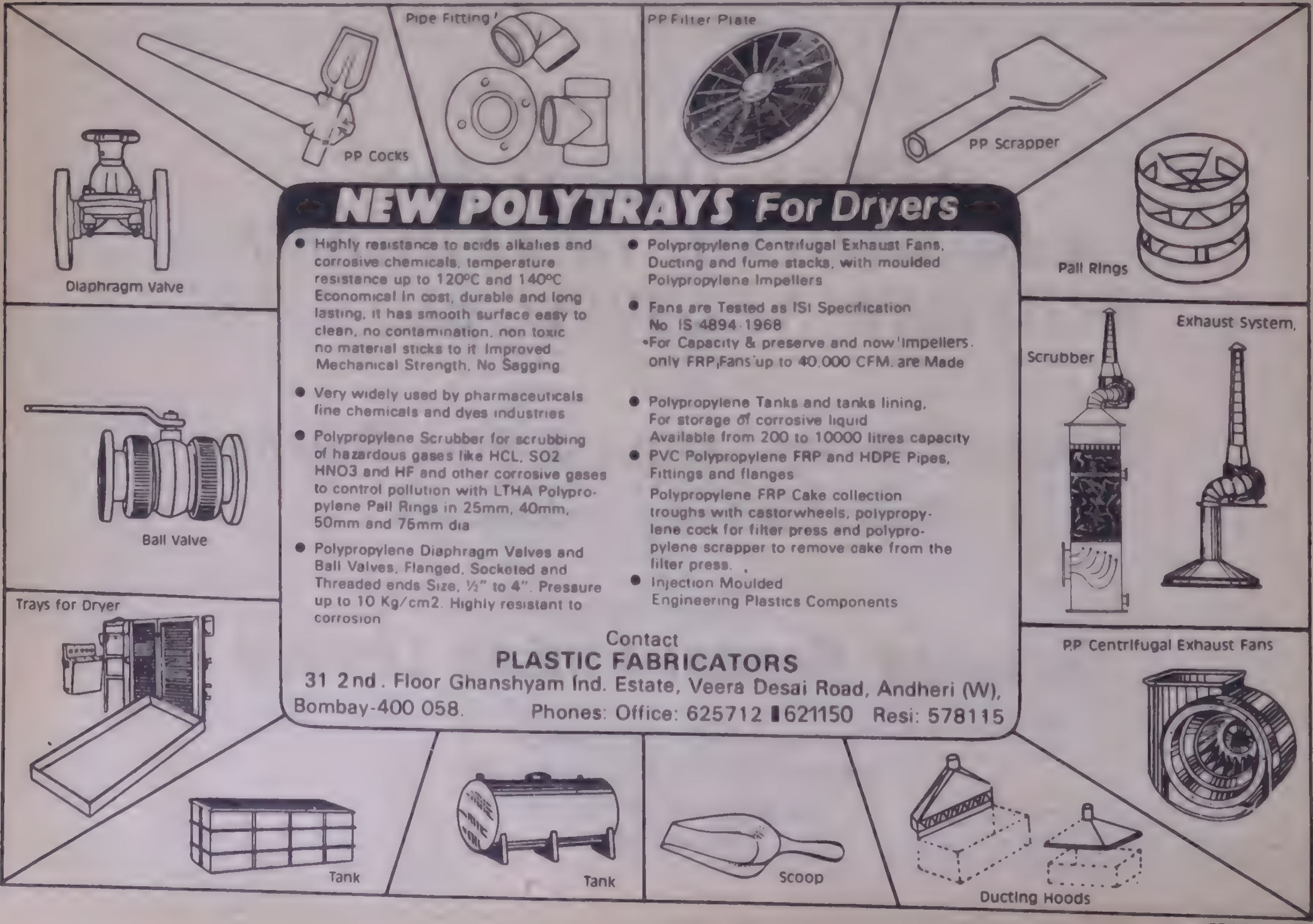

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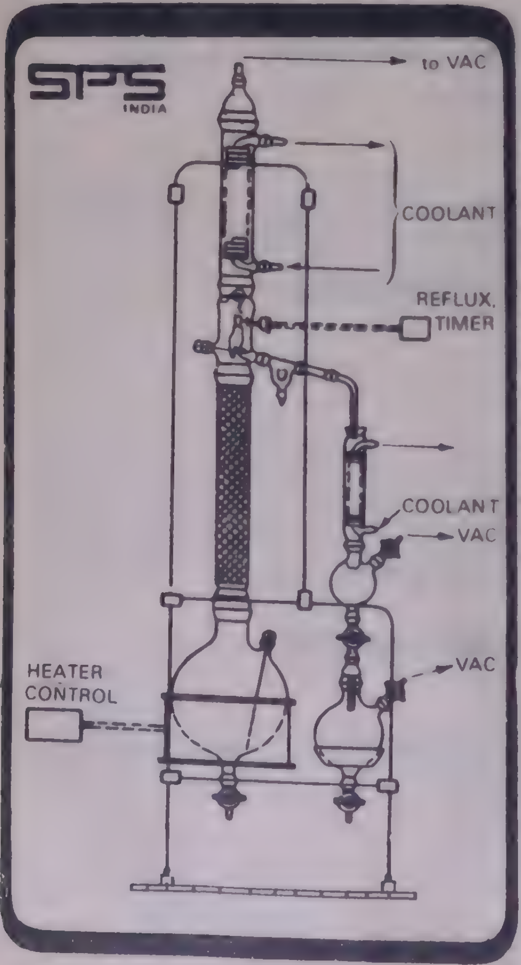

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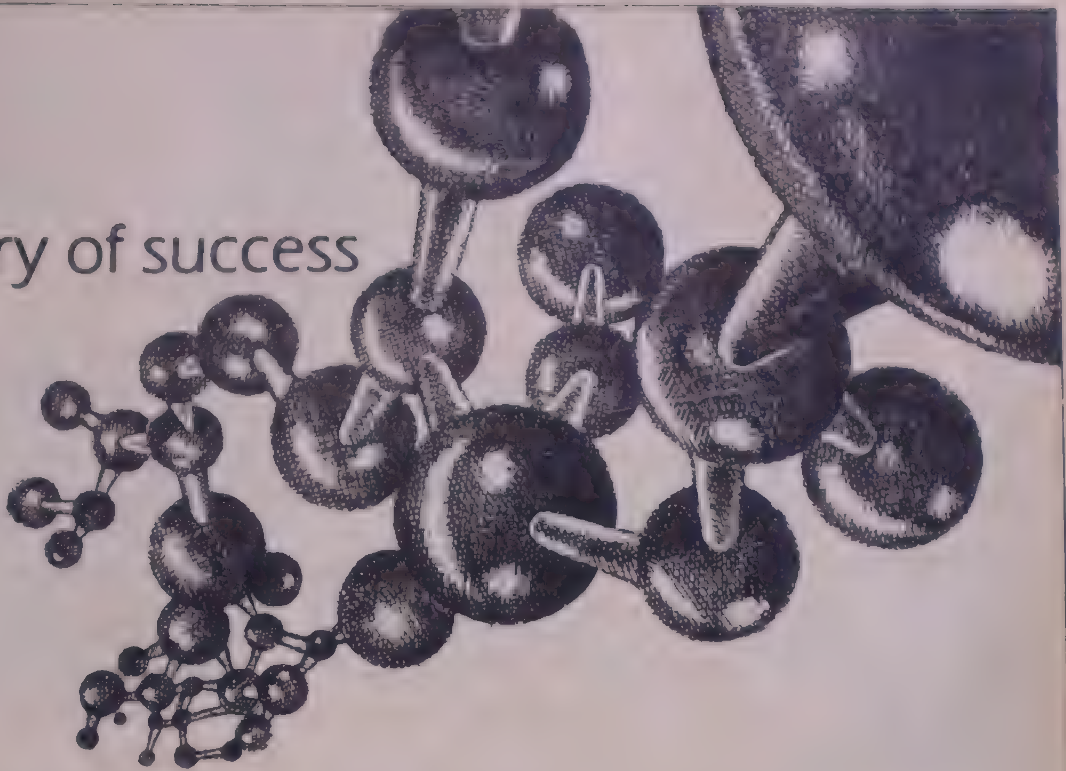

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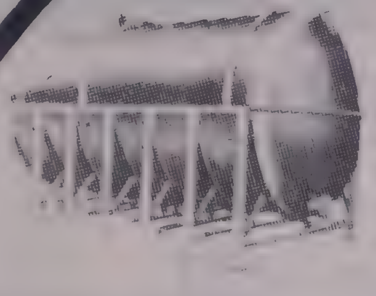

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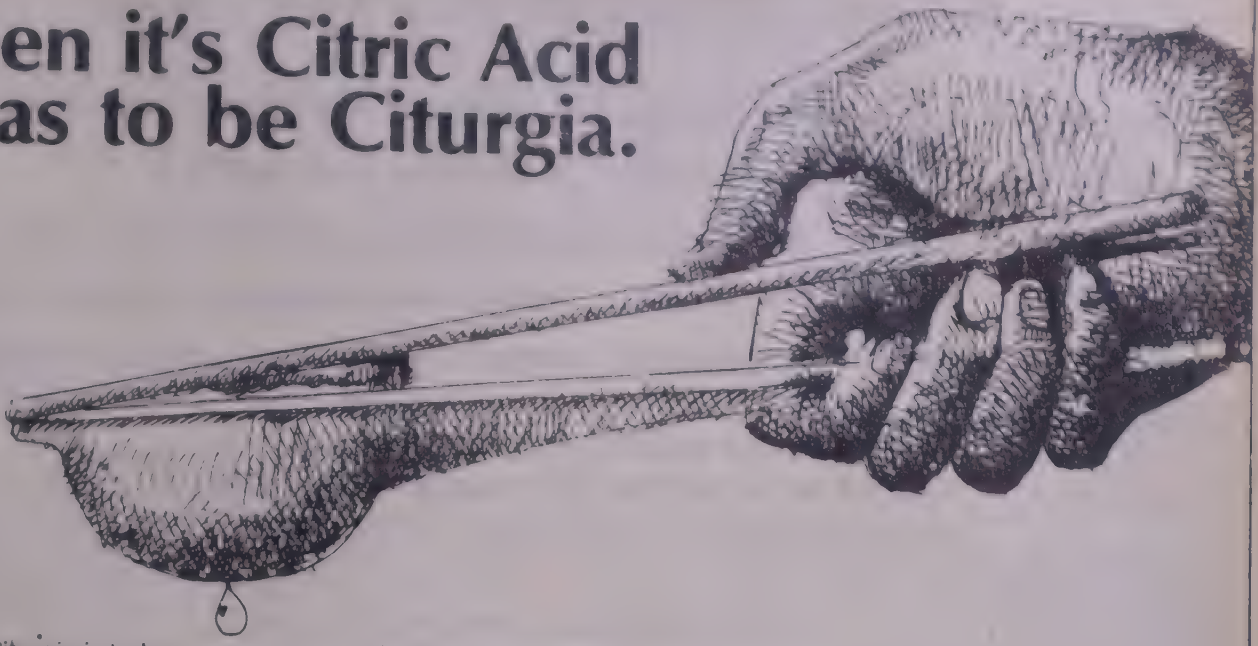

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CHEMICAL WEEKLY

VOL. XXXIII NOVEMBER 10, 1987 NO. 9

Quarter of a century of World Fertiliser Industry

The past twentyfive year period (1960-85) has witnessed far reaching changes in growth, technology, structure, choice of feedstock, and worldwide spreadover of an order which even the most optimistic technologist would not have forecast in the early sixties for the fertiliser industry.

Today, the industrially advanced countries account for one third of world fertiliser consumption and two fifth of production; but in the sixties three quarters of the World production originated from Western Europe and North America and accounted for two third of world consumption i.e. the exports formed less than 10% of production. The developing countries depended mostly on imports from Western Europe and North America for their domestic consumption.

The rapidly increasing population of the developing countries brought with them the poignant spectre of famine and food shortage. The Western countries deserve credit for their massive aid programmes as well as planned technology transfer to the developing countries. Even in the Socialist countries of Eastern Europe and Asia, fertiliser production and levels of consumption were dismally low.

The rapid technological advances during this era witnessed leap frogging increases in the size of manufacturing plants of ammonia, sulphuric, phosphoric and nitric acids besides multi-nutrient granular fertiliser products -- innovations manifested themselves not merely n the economies of scales of operation but in new products, and new feedstocks and lower costs.

The ammonia feedstock pattern exhibited dramatic changes. Natural gas and liquid gas accounted for 68% f world ammonia production in 1986 against only forty er cent in 1959. The share of naphtha and fuel oil fell rom 15% in 1959 to 11% in 1985-86. Electrolytic hydrogen as a feedstock slumped to a mere 1% in 1986 as against 5% in 1959. Use of coal and coke oven gas as feedstock fell by half from 40 to 20% during the same period. In the Arabian Gulf region, natural gas as a feedstock for ammonia took giant strides. Development of potash resources of Saskatechevan challenged the longestablished sources in Europe. So our natural gas was no longer an unwanted product. The rapid growth in demand for sulphur free oil resulted in improved sulphur recovery processes and production of high purity sulphur, outstripping the output of mined sulphur in the Gulf and Mexico.

Steam reforming of natural gas for ammonia manufacture with the displacement of reciprocal compressors by the centrifugal gas turbine revolutionised the nitrogen industry. Low cost piped natural gas offered greater flexibility in the choice of site for fertiliser plants fast replacing coal based plants located near the pit head.

Of the three basic plant nutrients, nitrogen exhibited the most spectacular growth. World consumption soared more than six fold from 11 million tonnes in 1960 to 70 million tonnes in 1985. USSR and China, where the nitrogen consumption was as low as 2.4 million tonnes, recorded a near fifteen fold increase to 31.2 million tonnes; from 1970 onwards USSR became the largest exporter of urea and ammonia.

Along with high yielding hybrid cereal varieties, the massive growth of ammonia output constituted the major factor in the fight against hunger in the developing countries with rapidly increasing population. The industrially advanced countries registered a comparatively slower growth rate for ammonia from six million tonnes in 1960 to 23 million tonnes in 1985-86. But their agricultural output became phenomenal with an unprecedented cereal surplus and a slump in commodity prices. In industrially advanced countries the ammonia plant capacity rose from 10 to 36.6 million tonnes, and the average size from 230 to 636 tonnes per day per plant, the corresponding figures for developing countries were 2.2 to 25.4 million tonnes with average daily capacity figures per plant rising from 138 to 635 tonnes. The countries with centrally planned economies registered the most spectacular growth from 3.9 to 57.2 million tonnes with plant production capacity rising from 284 to 703 tonnes per day during the twenty-five year period.

Distribution of ownership of plants reflected the established pattern of public ownership; ammonia plants in the public sector rose from 30 to 74 while those in the private sector went down from 70 to 26. Similar trends were evident in the case of the other two nutrients as well; sulphate falling to one fifth of the 1960 figure, ammonium nitrate to three fourth of the 1960 figure as against the quantum jump of urea from 8% to 35%.

World production and use of phosphate fertilisers rose three fold from 11.3 m to 33.8 m tonnes during this twenty-five year period. The Western and Eastern Europe and the United States persisted with higher phosphate dosage while the developing countries concentrated on the increased use of ammonia.

The product pattern showed a strong shift towards higher analysis products. In the States with centrally planned economies single superphosphate and direct use of phosphate rock continued to dominate. But the overall world figures revealed a fall in single phosphate consumption from 50 to 20% followed by a rise from 14 to 17% for concentrated phosphate, a jump from 21 to 55% in the case of complex fertilisers while the use of basic slag ground phosphate rock fell from 15 to 8%.

The volume of World Trade including the movement of superphosphate from the US and Western Europe to USSR peaked in 1984 at 3.6 m. tonnes and despite the stagnation of demand touched nearly 3.3 million tonnes in 1985. World phosphoric acid production rose from 3.2 to 16.2 million tonnes in the industrially advanced countries, from 0.3 to 8.2 million tonnes in developing countries and from almost nil to 9.0 million tonnes in countries with centrally planned economies during the twenty-five year period.

World production of potash registered a three fold increase from 8.8 m to 28.6 m tonnes. With the rapid expansion in the 1970s of the production capacity in Saskatchevan and in the Urals and Byelorussia, Canada and the USSR became dominant world potash producers. In Europe, the long established producers in France, West and East Germany consolidated their position in the domestic markets.

In the United States declining reserves in Carlsbad, New Mexico, mining region and the pressure of competition from Canada had its direct impact on the large domestic market. The exploitation of the potash resources of the Dead Sea by Israel and establishment of production by Jordan became significant factors governing the world potash market. The development of important new reserves in Spain made its presence felt in the European market. The Cleveland Potash Company controlled by the United Kingdom overcame the many production problems became a viable unit catering to a substantial portion of the U.K. market.

It needs hardly to be emphasised that the number of potash supply sources are very limited and hence logistics play a disproportionately important role in controlling the world potash industry. New developments are taking place in Brazil and Thailand but these may not have an impact in the world market in the coming decade. The new discoveries reported in Siberia may give a dominant role to the USSR on the threshold of the next century. In the coming decades, the dominance of State ownership has to be taken for granted.

In spite of the massive increases in production, world trade has polarised towards a small number of developing countries which because of their uncontrolled population still continue to import fertilisers -- India, China and Iran. The State controlled import agencies of these countries exert strong pressures in the world market. Thus the Western industrially advanced countries which were till recently strongly producer oriented are now becoming market oriented.

In Western Europe and North America, the prevailing agricultural crisis is reflected in the mounting stucks of food, falling land values and low agricultural commoditity prices resulting in stagnation and reduction in fertiliser use. But in most developing countries and especially in India, South East Asian fertilisers have played a decisive role in raising the nation from penury to food self sufficiency.

The world fertiliser industry is moving towards the twenty-first century when the nutrient consumption may reach close to 200 million tonnes per year with almost every developing country attempting self sufficiency in fertiliser and food production. The impact of this significant factor of the world fertiliser trade and economics is difficult to forecast. Biotechnology and biofertiliser as a source is not expected to affect the world trends.

(Extracted from an article by John Lancaster, Chairman of the British Sulphur Corporation in the ECN January, 1987)

-- T.P.S. RAJAN

CHEMARENA

S.L. VENKITESWARAN

Ethyl Alcohol Price Control

The revised controlled price on ethyl alcohol has been notified recently following the revised controlled price of molasses. It may be recalled that molasses price was doubled to Rs. 60 per tonne and so also was the central excise levy to Rs. 60 per tonne. The price for ethyl alcohol had not been revised over many years although detailed studies had been made on the cost of production several years back. The recommendations of the BICP were presumably found to be faulty and Government did not announce the revision but a certain indirect price control was in operation at State level after taking into consideration the actual rise in various items of cost. The prices in operation varied from State to State generally at over the level supposed to be in force. The price occasionally fell to below the informally agreed level in States like Maharashtra, UP, where excise levies made it nearly impossible to find buyers among the industrial users. After serious shortfall in the production of molasses and consequently of alcohol in the years 1985 and 1986, with the need for import of substantial quantities in bulk in tankers at a landed cost of near about Rs. 4 per litre at consuming centres (with no customs duty thereon), we are now facing a situation of large surpluses of alcohol for which there is no ready outlet even if the irrational levies at the State level are withdrawn.

The situation has become complicated by the revision of molasses price and the excise levy thereon even if the central excise levy on molasses is allowed to be adjusted under MODVAT in the central excise levy on products made from the alcohol. With no early solution for the surplus alcohol in sight, there is now a programme for exports of 20 to 25 million litres. Even so the problems cannot be solved because the new sugar season starts in November and much of the storage tanks for molasses at sugar factories and distilleries are occupied with last season's stocks. What is inexcusable is the lack of foresight on the part of the State and Central Governments in taking liberal measures through the approval of newer projects for industrial chemicals. The situation is rendered critical in Maharashtra where the large consumer Union Carbide has shut down operations and in Tamil Nadu where the prolonged illness and absence of the Chief Minister is said tobe holding up all decisions on the disposal of alcohol, the stocks of which have accumulated due to reintroduction of prohibition.

Certain questions and problems arises on the controlled price of alcohol as now notified. Infact these are problems which have been there all the time with no attempt to resolve them. The price fixed takes no account of the basic difference in production costs between units of different capacities and between units that are organised as independent units vis-a-vis those which are part of the sugar factory. This is no doubt a complicated problem and may not be equitably resolved. But there are other items on which serious rethinking is needed. Some of these are noted below:

(1) The Compensation for cost of transport of molasses has been specified at Rs. 330/KL as a ceiling but limited to actuals incurred in the previous year. This is equivalent to about Rs. 75 per tonne on molasses as the maximum allowable average transport cost. While this may be appropriate in States like U.P. where sugar factories are near each other and on the Railway line with sidings, in States like Maharashtra and Tamil Nadu there is a higher incidence due to more spread-out locations of sugar factories, most of them away from railway stations. Alcohol producers invariably have to lift over two thirds of their molasses requirements from sugar factories that are specified by the controller in the State. Often the alcohol producer is obliged to work at lower capacity levels than lift molasses from places where the transport costs would be far higher. Having agreed to "actuals" on transport costs the introduction of a ceiling is uncalled for and contradictory.

(2) There is an allowance of Rs. 300 per KL exclusively for producers who are permitted to use furnace oil as fuel. Most producers are obliged to use fuel from outside sources. The original concept of having surplus exhaust steam at nominal cost for use in distilleries holds good for a very small number of low capacity units. When you use our high ash coal at distant centres with transport of coal by road being necessary for many of the units, the cost of steam is as much as when gen-

erated from furnace oil. Moreover where additional bagasse has to be used for meeting the steam requirements for alcohol production, it is logical to provide adequate compensation for loss of sale value for the surplus bagasse reckoned on the equivalent of coal oil. There is every justification for making this compensation of Rs. 300/KL applicable irrespective of whether furnace oil or other fuel is used.

(3) There is a provision of Rs. 150/- per KL for those units who adopt anaerobic treatment of the effluent and a further Rs. 100/KL to those which have also installed aeration treatment of the anaerobic reactor effluent or of the discharge from lagooning. Here again there is a discrimination which is uncalled for. If the principle is that the costs for treatment of effluent other than lagooning which is practised today are to be compensated, there is no reason why systems other than anaerobic digestion should not be compensated. There are locations where concentration and incineration is the only way and there are systems of improved fermentation where you get a medium level concentration of effluent and therefore further concentration is most appropriate. Concentration is more costly and incineration even more so, though there is compensation in the form of byproduct potash. The specified compensation should be available irrespective of the method of treatment so long as discharge standards are met.

(4) The production from Khandsari molasses is also included along with an elaborate set of prices for such molasses which are also subject to controls. The experience of over two decades has been the near-impossibility of control over such molasses produced in isolated small units. The costs of control are more than the possible benefits. Perhaps Government could as well have left Khandsari molasses outside of price control and so also alcohol produced from it. Such production could have been left out for potable use or the molasses itself which is edible, for use in feed mixes. The Central Excise duty paid on molasses used for industrial alcohol production is to be given as a drawback in the Central Excise duty leviable on a long list of specified products made from the alcohol. This provision has been made too complicated and can lead to much confusion. There are large stocks of alcohol at distilleries and even with users and it is a problem as to when the adjustment could be claimed by the industrial user. The alcohol producer has to provide a certificate that the increased Central Excise duty has been paid on the molasses used by him for the supplies made to the party. There is no means of isolation of molasses or alcohol on which the Central Excise duty has been different. More important, is it not reasonable to give adjustment on molasses used even if the duty was at the earlier level, when the entire revised levy is to be waived? Again there is a peculiar provision that the concession will not be applicable when the alcohol has been paid for at prices higher than that specified in the price control order. What is the justification for denying this basic concession to a user who has no option but to accept supplies even at a higher price if he has to keep his plant in operation? There is urgent need to have a further look at the control structure on molasses and alcohol and ensure that realistic programmes for chemical usage of molasses/alcohol are evolved and implemented.

Vaccine Action Programme

Our Department of Biotechnology has signed up an agreement with the US for a Vaccine Action Programme which has resulted in a raging controversy not only between scientists but among a section of the public. Venomous attacks on this tie-up have appeared in some newspapers which are apprehensive of serious repercussions. In brief the programme provides financing by US of an amount of $9.6 million for testing high tech genetically engineered vaccines on people in India for a proper evaluation of the specific vaccines.

It is possible that the rigorous controls on such testing within USA and perhaps the lack of adequate volunteers may be one reason for such tests on Indians. There is a reasonable fear that the tests would provide free access to a very large body of epidemiologic data on Indians for possible misuse even if the allegations of possible biological warfare are unwarranted and farfetched. India is no doubt in bad need of vaccines at low cost as part of the public health-care programmes. The VAP project should really be viewed from the point of the actual programmes and under whose control and authority it will function. It is claimed on behalf of the Department of Biotechnology that there will be an Apex Body of Indian experts who will give clearance for the tests and trials and that bodies like the ICMR and the Drug Control Authorities would have effective control.

There is also no question of tests of any drug which is not approved by FDA in USA. But one aspect which is contradictory to India's present policy is in regard to copyrights and patents. The patent rights are likely to be in line with those in USA/Europe and not as per India's patent provisions which are more restrictive. Financing and testing of genetically engineered products on the helpless Indian population should not confer benefits that are more liberal than provided in the present policy.

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Alcohol exports mooted

The Centre should seriously consider the export of alcohol in the face of mounting stocks and stagnant demand, Mr. Bansi Dhar, chairman and managing director DCM Ltd., told The Economic Times at New Delhi on 30 October.

He said that the state of UP, alone, would have in store 4,500 lakh litres of alcohol within the next six months as against the national demand of 5,500 lakh lts. This will leave the alcohol from the sugar states of Maharashtra and Tamil Nadu, amounting to 1,000 lakh litres, as surplus with no possibility of utilisation within the country.

Mr. Dhar said that industrial alcohol consumption has come down conspicuously in the primary user states. For example, in UP, consumption has slid from 73.15 lakh lts in 1976-77 to 47.05 lakh during the last year. In Maharashtra, consumption has remained static at around 75 lakh lts. in the ten-year period.

With increased sugarcane crop and, hence, molasses, coupled with stagnating demand, the capacity utilisation of distilleries has fallen to an unviable 30 per cent over the last one decade.

The sad state of the industrial alcohol industry in the country can be traced to the irrational distribution policy and duty structure on this important source of raw material. While distribution is determined by the Centre, through the Centre Molasses Board, taxation is left to the respective state governments as alcohol falls under the concurrent list.

Alcohol being the largest source of revenue for the states, the duties on it tend to verge on the higher side. Besides, levies vary widely from state to state from as low as Rs. 0.25 per litre to a high of Rs. 10 per litre.

States have also built extensive tariff barriers in order to forestall movement from deficit to surplus states. High 'export pass' duties have been slapped by surplus states to stem the flow. The 'export pass' fee in UP is Rs. 10 per litre and in Maharashtra Rs. 5 per litre. The incidence of duties is a multiple of the ex-factory price of alcohol.

Mr. Dhar said that the distribution quotas allotted by the Central Molasses Board are not in keeping with actual demand-supply situation in the various states as deficit states submit inflated requirement figures while surplus states play down statistics. He, thus, called for a central agency to take care of both aspects.

Fluctuating duties have played havoc, both with distilleries as well as with the end-user industry. Several industries using alcohol have stopped production on account of the sky-high duties and 'export pass' fees. Industrial Explosives Ltd., which consumed around 400 lakh litres of alcohol to manufacture polyethylene, is reported to be on the verge of closure and is contemplating switching over to the petrochemical route. Similarly, Synthetic and Chemicals Ltd. Bareilly, which made styrene butadiene rubber had to resort to imports of intermediates in the face of high levies.

Mr. Dhar also claimed that the large-scale manufacture of end products through the alcohol process may not be viable when compared to the petro route. The alcohol route is feasible for smaller plants.

He said that while demand of alcohol for low-volume end products may pick up in the future, given a stable distribution and price structure, it is unlikely to keep pace with supply.

The low capacity utilisation level of distilleries has also created an acute problem of pollution as molasses are either allowed to go waste or buried in pits. Most distilleries do not have the financial muscle to set up expensive treatment plants.

Mr. Dhar said that under the above circumstances, alcohol should be allowed to be regularly exported. The price of alcohol is internationally competitive. Exports will also allow utilisation of idle capacity of distilleries, he added.

GUJARAT SOLVENT EXTRACTION UNITS IN DIRE STRAITS

Solvent extraction units in Gujarat are in dire straits. If suitable steps are not taken immediately, the entire industry would collapse and its revival would also be difficult at a stage.

The solvent extraction plants will have to remain closed in the new season. Although the Government has made arrangements for import of oilseeds it has made no arrangements for its distribution for crushing.

On the other hand other units in the rest of the country would be benefited when the imported material is distributed at a later date.

In fact, the situation has become so grave that even the State Finance Corporation has stopped financing solvent extraction plants because of its very poor profitability and inadequate return on investment.

Paradoxically on one side as the country needs to increase the supply of vegetable oil indigenously to overcome the huge import of edible oil, putting tremendous pressure on the foreign exchange reserve, on the other, the solvent extraction industry, which generates extra vegetable oil above the the normal availability, instead of being encouraged, is allowed to die.

The solvent extraction plants are capital-intensive projects. While the oil mills could be set up at very low cost a large number of mills have been set up at remote places. As the Centre's policy is to encourage small oil mills, it has been exclusively reserved for small-scale industry.

The important part is that the solvent extraction plant should use all these expeller cakes for recovery of oil, otherwise cake would go for direct consumption by cattle or in certain cases as direct manure like rape cake, castor cake, mahua cake etc.

According to small extraction units the State Government levies four per cent sales tax on the expeller cake. The processed cake after the de-oiled cake is separated is again taxed at the same percentage. In other words, a total of eight per cent tax is levied on the expeller cakes, if they are to be extracted.

Considering the average price of expeller cakes, at around Rs. 2,500 per tonne, the sales tax structure amounts to Rs. 200 per tonne and the average transportation cost at around Rs. 100 per tonne.

Solvent extraction cakes, therefore, costs Rs. 300 more per tonne as compared with expeller cakes due to these levies. Because of this it becomes uneconomical to extract oil from the cake and so a large quantity of the expeller cake goes directly to the consumers.

In fact, Gujarat has the advantage of having the largest capacity in organised cattle feed factories. As its dairies do not get the main raw material, i.e. solvent extracted de-oiled cake, they are imported from other States.

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Frankly Speaking

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Recipe for Survival in Chemical Industry

The well-known consultant in the chemical field, Dr. Charles H Kline, has sought to give a 'recipe' for survival in the chemical industry in the course of his memorial award lecture at the 1987 annual meeting of the US Chemical Marketing Research Association, Philadelphia, May 1987. The title of his lecture :

Life among dinosaurs

The 30 golden years (1946-1975) of rapid growth in the chemical industry has left many of the managers in the industry with dinosaur-like vision and as a result they have been unable to cope successfully in the subsequent era of slow growth. They have also failed to recognise :

- The end of 50 year cycle of innovation starting in 1930.
- The end of the era of large-scale substitution of natural products by synthetics.
- Managers lost sight of the fact that any business can effectively accomodate only 3-8 suppliers.

And these factors have led many a chemical company to get into trouble, some into deep trouble. Faced with this, there was a sudden rush from commodities to specialities, but the new entrants failed to realise that specialities require an intensive customer oriented approach and this cannot be acquired just overnight. Further there is not enough room for everyone and only the early entrants like Ciba-Geigy, W R Grace and Rohm & Haas who knew what it was all about, succeeded.

The trend now is to look beyond the specialities and the magic new words are advanced materials, electronic devices, integrated systems and diagnostic aids. Again remember that there is room for no more than 8 manufacturers in each case. As an example, there is bound to be a shake out of the weaker companies among the 20 odd producers of carbon fibres. Successful development of new products requires intensive R & D and marketing efforts and in order not to fall again into the dinosaur-vision trap, managers will need to constantly re-evaluate products, procedures and future direction. A watchful eye has also to be kept on the activities of the competitors as also changes in world economy. The entrants into newer fields must have the courage and confidence of their managers and must, of course, be willing to take calculated business risks.

An indication that we are currently at the end of a cycle of innovation is provided by the number of innovations in each of the decades starting with as many as 63 in the 30's :

24 in the 40's
11 in the 50's
9 in the 60's
2 in the 70's

In the 80's so far there has been only one innovation. The spate of innovations in the 30's included five main thermoplastics, the synthetic fibres and rubbers, the first synthetic detergent, colour film, fluorocarbons and an entire range of insecticides and herbicides. Also as the number of innovations reduced with each decade, the R&D effort slackened on the basis that it was proving to be non-productive. And this led to a further reduction in the number of innovations.

Prosperity lies not necessarily in growing bigger for bigger is not necessarily better. The watchword today is to be 'lean and mean'.

(Source : Ch

Shaw Wallace to undertake oil drilling

Shaw Wallace and Co. Ltd., has formed a joint venture company with Blocker Corporation Inc. the US, to undertake contract drilling and supply of rigs and other equipment for offshore and onshore projects of Oil and Natural Gas Commission and Oil India Ltd., according to Mr. M. R. Chhabria, Chairman of the company.

The company is also negotiating with a well-known engineering company in the US for manufacturing in India machinery and equipment for oil and gas industry. Other projects for the manufacture of white cement, oil well cement, special cement and also export-oriented computer software outfit are in various stages of finalisation. The new management is also keen to revive sick industrial units with high-growth potential, the annual statement to shareholders said.

Mr. Chhabria has expressed satisfaction over last year's performance and looks forward to future with optimism. According to him the new management is confident that, barring unforeseen circumstances substantial improvement in all-round performance will be reflected during the current year with corresponding increase in profitability.

The new management said that the negotiations with foreign parties had reached an advance stage for enlarging the range of pesticides at the agro chemicals complex at Haldia in West Bengal.

The company proposes to increase the volume of group turnover of the liquor business including exports. Diversification programmes have been finalised in high-technology areas and it is proposed to set up export units.

Diversification and expansion programmes would help enable the company achieve within the next three years over 100 per cent growth in turnover. A joint venture company is being promoted in collaboration with Geophysical Services Inc. US, a subsidiary of Texas instruments Inc. the US industry by providing data from seismic survey.

GAS PIPELINE PROJECT FOR AGARTALA

The Oil and Natural Gas Commission (ONGC) is preparing a project report for tapping the natural gas now available in abundance in Tripura.

Official sources said in Calcutta on October 29, that the Commission, on request from the Tripura Government, was also preparing a blue-print for a Rs. 6 crore gas pipeline project. The project envisaged pipe supply of gas to Agartala for domestic use.

The possiblities of setting up natural gas-based industrial projects in the hilly north-eastern State figured at a discussion on October 23 between Tripura Chief Minister Mr. Nripen Chakraborty and ONGC Chairman, Col. S. P. Wahi.

As ONGC reckoned, if the current development programmes were carried out as planned, Tripura's power sector could turn out to be a major user of natural gas.

As of now, the Tripura State Electricity Department (TSED) required about 70,000 cubic metres a day to keep its five MW turbine operational. A second turbine is slated to be commissioned shortly, and the third one is expected to be in operation around mid-1988 by which time the combined capacity will be 15 MW.

Besides, the Government is considering a proposal to set up a 75 MW (7.5 MW x 10 turbines) gas-based thermal power project at Rokhia, a principal point of supply. A decision relating to the project is expected shortly.

As for the industrial sector, the Commission has indicated to the Government that a methanol plant can be set up utilising the availability of natural gas. However, the private sector's response to the situation has not yet been received.

Meanwhile, the State Government has written to the Centre proposing setting up of a gas-based fertiliser plant. It is also considering a proposal to popularise use of natural gas in the State's transport sector. The Commission is expected to submit its report shortly.

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Tata salt plant closure ordered

The Salt Commissioner of Jaipur has directed Tata Chemicals Ltd. to shut downs its plant in Mithapur, Gujarat.

The Commissioner has also asked the company to destroy stocks of vacuum evaporated salt amounting to Rs. 4.50 crores, according to reports reaching Bombay.

The closure of the plant will affect about 6,000 workers, according to information available in Bombay. The Mazdoor Mahajan Sanch has requested the State Government to intervene and help reopen the plant in the interest of the workers.

The closure order is a sequel to the continuing threat to ground-water reserves in the water scarce Saurashtra region following steady discharge of liquid effluents by the Tata Plant. According to industry sources in Bombay the immediate provocation which prompted the Salt Commissioner's order could not be ascertained. Senior officials at the company's headquarters at the Bombay House refused to comment.

The Mithapur plant converts sea water into soft water required in large quantities in the manufacture of soda ash and other chemicals. Vacuum-evaporated salt is a by-product. Environmentalists and officials of the Gujarat Pollution Control Board had taken a serious view of the inadequate effluent treatment facilities at the plant which allowed groundwater to be contaminated, affecting the water supply of the village folk.

"Tata salt", the iodised table salt manufactured by the company, was catapulted into a leading brand in urban centres following high-voltage advertising in the print media and on the radio. The results have been rewarding. Last year, sales of caustic soda increased by 35 per cent, benzene hexachloride by 16 per cent, bromine by 83 per cent and iodised salt by 223 per cent.

It is a measure of the company's confidence that it decided to forego the subsidy announced by the Government for iodisation of salt under the national programme to eradicate goitre, the sources said.

The company is almost self-sufficient in kurkuth salt, the basic raw material for most of its products. Last year, out of an estimated 2.2 milli

tonnes precipitated, it harvested about one million tonnes of salt and banked the balance in crystallisers.

GOVT. GETS JOINT VENTURE PROPOSALS FOR OIL SECTOR

In response to the indigenisation drive launched by the Oil and Natural Gas Commission, the Government has received nearly 140 proposals for joint venture and technical collaborations covering the entire spectrum of exploration, drilling and production activities.

A large number of Indian and foreign companies had envinced interest in the manufacture of equipment, materials and supply of services to the oil sector, Col S. P. Wahi, ONGC Chairman, said on 31st October. The cumulative achievements of indigenisation up untill March this year had been to the order of Rs. 2,907 crore, he added.

He said the Commission had initiated the idea of setting up joint working groups with the Confederation of Engineering Industry (CEI) to accelerate the process of indigenisation in the wake of global recession.

To provide a fillip to this idea the recently constituted working groups had already discussed a time-bound action plan for developing in-house capability in the industrial sector for multi-disciplinary programmes of ONGC and for development of export potential. The foreign exchange outflow in relation to the plan expenditure had been brought down to 41 per cent in 1986-87, he added.

The Chairman said some of the major services indigenised to a large extent were diving services, supply vessels, inspection through NDT inspection vessels, management of OSVS and MSVS coating wrapping, weight coating, and laying of pipelines both offshore and onshore. Other services included engineering and soil investigation surveys, tidal observation, radio positioning equipment and satellite navigation system, engineering consultancy and certification.

Efforts were now on to build up indigenous capability in the fields of logging cementing, logistic support services and seismic data acquisition, he added.

Mr. Wahi said indigenisation of

sulted in a saving of approximately Rs. 73 crore in foreign exchange per year.

TN PANEL TO LIAISE WITH ONGC

The Tamil Nadu Government will constitute a committee to coordinate with the Oil and Natural Gas Commission, so as to expedite the commercial use of gas.

Giving this information in a chat with newsmen, the State Industries and Agriculture Minister, Mr. K. Rajaram, also indicated that the committee would help ONGC expedite its exploratory work, by giving the latter the necessary land on a priority basis. For instance, the Government recently allotted 138 acres of land near Nagapattinam.

As for coordination with ONGC in the actual use of natural gas, Mr. Rajaram said three gas turbines of five mw each would be commissioned in consultation with ONGC, so as to put to good use the free-flowing gas, as also the oil-associated gas, struck so far in the Cauvery basin.

Praising ONGC on its efforts to tap oil and gas in the Cauvery basin the Tamil Nadu Minister said ONGC had so far spent Rs. 190 crores. Oil prospects were considered significant in the Vedaranyam off-shore basin too, though ONGC was presently concentrating on the Narimanam-Kovilkalappal-Bhuvanagiri region.

Pointing out that no funds limit had been set by ONGC for its exploratory work in the Cauvery region, he said one oil well at Narimanam was already under "constant yield".

PERSONALITIES

R. K. NARANG

Mr. R. K. Narang has taken over as executive director (oil coordination committee) of Indian Oil Corporation Ltd. from Mr. B. M. Lal who has attained the age of superannuation. Mr. Narang was earlier general manager (LPG) at the head office of the corporation's marketing division in Bombay.

ARUN P. SHETH

Mr. Arun P. Sheth has been elected chairman of Indian Institute of Chemical Engineers. The other office bearers are: Dr. M. C. Chhabria, vice-chairman, Mr. A. K. A. Rathi, hon. secretary; Mr. P. P. Bhatt and Dr. C. M. Ramaswamy, hon. jt. secretaries

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INDUSTRIAL SICKNESS

States told to set up rehabilitation boards

State Governments should step in to check the growth of sick industrial units by establishing rehabilitation boards for this purpose as their policies had been one of the factors responsible for making many units unprofitable and unproductive, according to Industrial Development Bank of India's (IDBI) Chairman, Mr. S. S. Nadkarni.

In his keynote address at a seminar on "Sickness in industry — need for fresh approach," organised by the Indian Merchants Chamber in Bombay, Mr. Nadkarni said that several State Governments offered incentives to lure industrial investments without giving the necessary attention to their future prospects.

While most of the States in the country had ventured to establish industrial development corporations, Mr. Nadkarni said that no State had so far considered it necessary to establish boards for reviving units turning sick. In his opinion even the duties imposed by some State Governments on products coming in from other states to safeguard the interests of the local units had been responsible for sickness in some sectors.

Even the development banks had been guilty of furthering this problem as most of them had looked at each project seeking assistance individually and not in totality of the industry concerned, Mr. Nadkarni said and added that only about three years ago they had commenced paying joint attention to the proposed projects seeking financial support with emphasis on local demands and production capacity. This had made the development banks keep new proposals related to cement plants and automobile tyres at bay he said. In the spinning wing of the textile sector, except for the assistance rendered to a few plants in Assam, the financial institutions had been more selective in extending a helping hand, he said.

The Bureau for Industrial Finance and Reconstruction (BIFR) had not been able to function effectively, essentially due to the problems created by the State Governments, trade unions and some promoters, he said, but felt that this bureau had recently succeeded, at least in coordinating the financial institutions and the commercial banks to sow the seeds of professional management in industrial units.

The lead banks are used by the financial institutions to fill the communication gap that had kept them ignorant about units falling sick, especially in the small-scale sector, he said, and hoped that the communication gap existing between the commercial banks and their major corporate clients would be bridged soon.

Mr. Nadkarni was also critical of many entrepreneurs wanting to be managing directors of too many companies, but having little time to manage even one professionally and profitably. Over extension of the family personality in the corporate entity seen during the post-Independence era had made many units sick, he said and emphasised the need to introduce management audit in every company like the one brought in by the former Chairman of the Industrial Credit and Investment Corporation of India, Mr. H. T. Parekh.

Many Indian industrialists who blame Government policies for their problems do not care to visualise them at the time of extending favours to get licences for their projects, Mr. Nadkarni said, and accused them of virtually ignoring the debt-equity ratio of the project at the construction stage itself. According to him during the last three decades only two companies had cared to have a bigger share of the capital and even these companies had recently fallen in line with other companies.

Noted industrialist, Mr. Viren J. Shah, who claimed to have been the "Chairman of four companies, including two abroad, that had turned sick," said many solutions are evolved at such conferences but no effective action was taken to contain sickness. While the money lost by the banks and investors are noted, Mr. Shah lamented that no one paid any attention to the money lost by the suppliers and employees of these units.

The burden of carrying these sick units on, through nationalisation or servicing them with soft loans, were passed on to the poorest Indians, he said. "Swift and deterrent punishment to the dishonest entreprenerus" was called for to help other units remain alive, Mr. Shah said and added that though over 1.3 lakh units had turned sick, locking up bank credit amounting to Rs. 4,665 crores, not many of the entrepreneurs involved had become financially unsound.

Mr. P. M. Mantri said that industrial sickness would continue to rise unless due attention was given to gaining the cooperation of labour. While it might be easy to blame the trade unions who were known to oppose the proposed amendments to the industrial disputes Act and trade unions Act, Mr. Mantri pointed out that less than 30 per cent of the industrial workers were unionised so far and said that the managements must become more responsible in utilising the human resources by educating the workers. "Credibility of the management has to be established by showing information related to corporate finances to the workers to have industrial peace, he said.

Earlier in his welcome address the Indian Merchants Chamber President, Mr. Nalin K. Vissanji, said that the amount sunk in sick industries was more than the total taxation in the budget for the current year and added that the situation had worsened further during the last 15 months. Unless the entrepreneurs associated themselves with the banks, financial institutions and workers in undertaking an anti-industrial-sickness policy jointly, the country could not become an economically advanced one by the turn of this century, he said.

COMPANY BRIEFS

Citurgia Biochemicals: The plant is being expanded to 8000 tpa. The plant manufacturing calcium carbonate at Rishikesh is being modernised.

Oswal Spg. & Wvg.: Plans to expand the steel capacity unit from the present 5586 tpa to 16436 tpa. Also plans to set up 2400 worsted spindles in the joint sector.

Ion Exchange: Setting up a unit in Gujarat for the manufacture of reverse osmosis membrane modules and systems. It is expected to go on stream by early next year.

Sadhana Nitro Chem: Has completed the expansion of its dye intermediates project. The expansion programme for the manufacture of meta aminophenol is expected to be completed by the end of next year.

DRUG TESTING

National programme likely

A national programme for setting up facilities for drug testing in the country may be included in the Eighth Plan.

The Health Ministry will soon take up this proposal, the Planning Minister, Mr. P.V. Narasimha Rao, said at a meeting of the Parliamentary Consultative Committee of his Ministry.

Mr. Rao emphasised that a strong and effective infrastructural base for drug testing was necessary for implementation of drug control measures.

He agreed with the members that there should be no compromise on the quality of drugs.

Replying to a query on the estrogen progesterone forte drug, members were informed that four public hearings were held by the Drug Controller and evidence collected was being examined. The report will be placed before the Drugs Technical Advisory Board for recommendation to the Government.

Members were also informed that concerted efforts had been made to ensure adequate supply of vaccines to areas covered under the universal immunisation programme. It was also stated that the programme was being regularly monitored to see that vaccines reached all the centres in time.

A proposal for an independent evaluation mechanism to further strengthen monitoring was also under consideration.

The committee was informed that States had been requested to strengthen the drug control machinery to make it more effective.

It was all the more necessary in view of the fact that the number of units licenced to manufacture drugs would go up further during the Seventh Plan period. At present, there are over 16,000 units licensed to manufacture allopathic drugs.

The members wanted the Government to take stringent measures and curb manufacture of substandard and spurious drugs. A member suggested setting up of special courts to deal with cases under the Drugs and Cosmetics Act expeditiously.

Regarding withdrawal of certain drugs from the market, the committe was informed that the World Health Organisation had so far reported withdrawal of 37 drugs by certain countries. Out of these, 19 were not approved for marketing in India

The committee was informed that 28.382 samples were tested

OLEUM LEAK IN AHMEDABAD

At least two persons were hospitalised and about 5,000 fled the Behrampura locality when poisonous oleum gas leaked out of a chemical factory in Ahmedabad on November 5.

About 10,000 litres oleum in a tank of 14,000 litre capacity started evaporating reportedly due to leakage of a valve. The chief fire offcer, Mr. Dastur went to the spot and closed the tank head with sand. Nearly 5,000 people evacuated the area. The gas was spread in about a one km area.

The Deputy Health Officer of the municipal Corporation, has instructed the closure of the factory located in the GIDC estate in Behrampura area. Textile dye intermediates are made in the factory.

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Price control on small drug firms lifted

The Union Government has exempted all "independent" small drug firms from the price controls relating to manufacture of all category II formulations. It is also likely to extend this concession to bulk drugs used in the production of these formulations.

The Department of Chemicals and Petrochemicals had avoided the issue of granting price exemption for small-scale sector while announcing the Drugs (Prices Control) Order (DPCO), 1987, on August 26. It had then stated that it was considering separately a proposal to raise the price exemption limit for this sector. Under the DPCO, 1979, which was repealed on August 26, all small firms with a turnover of less than Rs. 50 lakh were exempted from price controls.

The latest price exemption for category II formulations is subject to the condition that the concerned small firm is "independent" and not "a subsidiary of or owned or controlled in any manner by any other undertaking which is not so exempted from the provisions of DPCO, 1987".

Another stipulation is that the price-exempted formulations are marketed by the concerned small firm under its own brand names and not under the brand names or trade marks of any other company.

These conditions have been imposed to prevent the organised sector undertakings from availing of the benefits of price exemption by setting up small firms or by entering into marketing arrangements with them.

Several large firms, both Indian and foreign equity companies, had set up benami units in the small-scale sector or started marketing the drugs of small firms to escape the rigours of price controls envisaged under DPCO, 1979. This practice had kicked up a major controversy both in Parliament and outside.

The National Drugs and Pharmaceuticals Development Council, in its report on proposed new drug policy in August 1984, had thus, recommended that small formulators should be exempted fully from price controls, barring those firms which were linked to large organised sector companies through ownership and marketing arrangements.

According to industry sources, the decision to exempt category II formulations produced by independent small units falls short of the requirements. They say that this concession should be extended to category I formulations as well as bulk drugs required for production of category I and II formulations. They say that the Kelkar Committee, whose report forms the basis for categorisation of price control formulations, had recommended that there be no price control on the small-scale sector.

Category II includes all formulations which can be made from 139 specified bulk drugs, whereas category I includes all formulations manufactured from 27 specified bulk drugs.

DRUG DEALERS SEEK HIGHER MARGINS

In a curious development the chemists and druggists have asked the Union Government for more trade margins than what has been earmarked for them under the new Drug Price Control Order.

The druggists and chemists, who met the secretary in the Department of Chemicals and Petrochemicals, Mr. H.K. Khan, wanted a trade margin of 10 per cent, for wholesalers and a margin of 20 per cent for retailers instead of the three per cent and 17 per cent, granted respectively to them under the new DPCO.

With this representation of the All-India Organisation of Chemists and Druggists, the controversy over the implementation of new trade margins under the new DPCO, has deepened. The drug industry had earlier expressed its reservations about the new trade margins for wholesalers and retailers. Subsequently, the Government had asked the industry and the trade to sort out the margin issue between themselves and arrive at a mutually acceptable formula.

However, in spite of several rounds of discussion, the industry and the trade could not resolve the trade margin issue. Their failure to do so frustrated the Government's attempts to implement the new DPCO, as no company had come forward to get the drug prices revised as per the new order since the trade margin issue had not been resolved to mutual satisfaction.

The chemists and druggists representation seeking a higher trade margin, has thus added a new dimension, as they now supported their demand by claiming that even in 1984 they had sought, though unsuccessfully, an increase in the margin. They have been arguing periodically that the trade margin provided in the order was not adequate.

They argued that no relief was granted to the trade even while promulgating the 1979 Drug Price Control Order, in spite of assurances of the Government. While there were provisions for price escalations for the industry, there was no such provision for the trade, they added.

PROJECT TO TURN SEWAGE INTO WATER

The Cornell university agricultural engineers say that they have devised a sewage-treatment system that can produce reservoir-quality water at little or no cost.

The Cornell university engineers use an unusual bacterial technique to filter out heavy pollutants and then grow plants hydrophonically in the partially cleaned waste water, says a report published in Washington on Nov. 3rd.

Bacteria that multiply in the process produce commercial quantities of methane gas, and nursery plants and trees are nourished by the water. They in turn remove nutrients and most of the remaining pollutants in the water.

In hydroponic horticulture, plants are grown in a nutrient-rich solution instead of soil. Unlike other experimental waste water treatments, this system produces no sludge or other waste matter.

However, before the water is used to grow plants, "as much sludge, soluble organics and suspended solids as possible" are filtered from it.

Then, anaerobic bacteria, which grow in the absence of pulverized are suspended in particles of corncobs in the waste water. These rapidly convert soluble organic materials into methane. To produce drinking water, a third step would be needed; to remove remaining pollutants.

RESEARCH & DEVELOPMENT

SUPERHARD CERAMIC-METAL BONDING TECHNOLOGY

Sumitomo Electric of Japan has succeeded in developing the world's strongest ceramic and metal bonding technology enabling a bond strength of 52 kg/mm2 (breakage resistance at room temperature).

Silicon nitride (Si_3N_4) offers great potential as a structural material for gas turbines and similar equipment because of its superb resistance to heat, corrosion, and wear. However, because fine ceramics like Si_3N_4 and silicon carbide (SiC) are difficult to process, they impose limits on the manufacture of parts with complex shapes and their integration in equipment. The development of a superhard ceramic/metal bonding technology has long been awaited.

The Si_3N_4 steel bond has a break-resistant strength of 50 kg/mm2 or more from room temperature to 400°C and 10 kg/mm2 or more at 800°C. These are the highest values announced to date and the company expects that the demand for Si_3N_4 ceramics will increase for use in gas turbines, automotive engine parts, and wear-resistant machine tools.

Sumitomo Electric's newly developed ceramic and metal bonding technology sandwiches a layer of composite alloy between thin-film, laminated, metallised Si_3N_4 (formed by ion-plating) and steel and then applies heat.

Several bonding methods have been previously developed and some are in practical use, but they generally require the application of pressure during heating in order to obtain a strong bonding.

With the newly developed bonding method, bonding is achieved by surface heating; no pressure is necessary. This makes it suitable even for products with complex shapes, and its uniform bonding strength results in high reliability — a prerequisite for mass production.

Sumitomo Electric is investigating the use of Si_3N_4, aluminium nitride, zirconia and alumina in response to widespread demands for wear-resistant machine tools, cutting tools, precision machine parts, precision heat and corrosion-resistant parts, and electronic parts.

—Current News from Sumitomo Electric.

INCREASING USE OF LIGHTER MATERIALS IN JAPANESE CARS

In 1986, the Japan Automobile Industry Association published a survey on materials used for passenger cars. According to this survey, the total weight of passenger cars increased to 106.8 per cent of that of the previous year, while it had been decreasing for the previous five years.

Light weight materials including aluminium and plastics have been finding greater use. For steel, high tensile steel and surface treated steel plate found greater use than ever before. The increase in overall weight was due mainly to large size, performance and equipment, though light weight materials were more frequently used.

Use of steel had decreased yearly, but high-tensile increased from 1.4 per cent in 1980 to 7.3 per cent in 1986 and surface treated steel from 1.5 per cent in 1980 to 2.8 per cent in 1986. In accordance with progress in car performance, more equipment was added so that the number of parts had increased to result in greater weight.

As for steel, total weight did not change as the improvement in performance was offset by reducing weight through employment of high performance steel. On the contrary, use of non-ferrous metals and non-metallic materials increased by 0.5 per cent and 1.1 per cent respectively. Employment of aluminium to radiator resulted in its increase by 0.4 per cent. Polypropylene increased by 0.8 per cent, polyurethane by 0.3 per cent and ABS by 0.2 per cent.

GRANT TO TIFR FOR SUPERNOVA RESEARCH

The US National Science Foundation (NSF') has awarded a grant to the Tata Institute of Fundamental Research (TIFR) in support of research in supernova physics.

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The US Assistant Secretary for Oceans and International Environmental and Scientific Affairs, Mr. J.D. Negroponte, presented the NSF's first instalment cheque for Rs. 3,62,500 to Dr. Virendra Singh, Director, TIFR recently.

The project, on which Dr. S.M. Chitre of the theoretical astrophysics group at the TIFR and Dr. D. N. Schramm of the astronomy and astrophysics section of Chicago University have been collaborating for a long period, would get a considerable boost due to the grant.

The project is expected to last three years, according to a USIS release.

NEW TREATMENT FOR ILL EFFECTS OF RADIATION

Treatment with two naturally occurring substances that stimulate bone-marrow may protect against some of the most lethal consequences of radiation exposure and cancer chemotherapy, researchers say.

Radiation and anti-cancer drugs both interfere wtih bone-marrow's production of infection fighting white blood cells. The new treatment triggers renewed production of those cells thus lowering the likelihood of lifethreatening infections, according to a report in the current issue of the proceedings of the National Academy of Sciences.

"The period when the patient is at greatest risk of infection due to reduced white cell functions is reduced", said Dr. Malcolm Moore, a cancer specialist at the Memorial Sloan-Kettering Cancer Centre in New York city and principal author of the New Study.

If such drugs prove successful in human trials that are now beginning, their principal use would be with cancer patients receiving chemotherapy or radiation treatment and with people suffering from other bone marrow diseases.

Such drugs could also serve as a treatment for people exposed to radiation during nuclear war, Dr. Moore said.

Previous studies by Dr. Moore and others have shown that one of the substances, called granulocyte colony stimulating factor, or GCSF, could boost numbers of the white blood cells knows as neutrophils, which defend against invading bacteria.

GERMAN TECHNOLOGY FOR COKE A SUCCESS

Saarberg stamp charging technology, which converts low-grade coals into coke is now being used with success in the Federal Republic of Germany and France, while the GDR, Poland and the Soviet Union will soon be employing it.

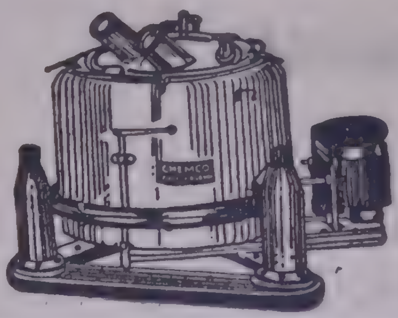
The Tata Iron and Steel Company has already opted for this technology and SAIL is examining it for use at Durgapur and other plants established with Soviet assistance.

Tests have been carried out on Indian coal for two plants of the Steel Authority of India and it has been established that the plant's intake of coking coal could be reduced from 60 per cent to 45 per cent by substituting it with coke blended from inferior coals. Saarberg technology could result in saving of foreign exchange, since coke imports, which amounted to around 2.25 million tonnes last year, would be reduced.

Wider use of this technology could vastly improve the steelcoke position in the country. The technology is designed to ensure maximum environmental protection and also allows the use of petroleum coke and breeze in the charge of coke blend.

Saabergwerke AG, wholly-owned by the Federal Republic of Germany and the state of Saarland, along with its subsidiaries and associates, is an integral energy-producing group and also offers expertise in the recycling of municipal waste for the power generation to Indian agencies.

Though steel production all over the world is on the increase, prime coke reserves are dwindling. This is true of India as well despite its large coalfields. Modern technology can, however, remedy the situation even with Indian coal which has a high ash content.



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DOMINANCE UNDER MRTP ACT

Export output won't be taken into account

The Government has decided in principle that export production will not be taken into account for purposes of establishing dominance under the MRTP Act, and it will be kept outside the licensed capacity.

In continuation of the policy announcement in September last year, the Government has further decided that firms which are willing to export 60 per cent of their production should be allowed to manufacture selected goods which have good export possibilities. This will be decided on a case-to-casse basis. The stipulation that firms should set up such industries only in backward areas will, however remain.

The Government has taken these decisions to give a boost to the export effort, which may suffer serious setback, particularly in view of the falling value of the dollar in the international market and most of Indian exports are expressed in dollars.

The Government has, therefore, also decided, though in principle, that there should be full remission of excise duties and domestic taxes on export goods. This too would be worked out on a case-to-case basis.

The remission may also take into consideration the profitability in exports of a particular product.

While within the parameters of the principle of rebate in duties, the Government is already operating duty drawback and cash compensatory support (CCS). In some cases, implementation of the schemes is found to be inadequate and non-remission of duties has been known to have put Indian exports at a disadvantage.

Further, the Government has sanctioned a scheme for providing subsidy assistance for acquisition of plants in order to encourage production of value-added items.

Again, a decision has also been taken to allow a debt-equity ratio of up to 4 : 1 for export thrust industries. In order to promote projects and consultancy exports, a scheme to grant 50 per cent subsidy for submission of tenders, subsidy for establishing consultancy offices abroad for a period of five years and 10 per cent of project assistance for consultancy exports is being introduced.

Already, the Government has announced several incentives to give a boost to exports and exporters are allowed, barring a few products, to utilise five to 10 per cent of their foreign exchange earnings for undertaking export promotion activities.

Also, raising the limit of assets from Rs. 20 crores to Rs. 100 crores for definition of large houses under the MRTP Act, delicensing of various industries and broadbanding would have their impact on generating industrial production generally. However, many of the industries identified by D.V. Kapur Committee as having export potential have been included in Appendix-1 of the Industrial Development and Regulation Act for being delicensed.

ENERGY SUBSIDIES MAY HIT CONSERVATION

The U.N. funded World Resources Institute (WRI) has warned that the existing practice of extensive energy subsidies world-wide would prove costly and detrimental to energy conservation drive.

In a recently published study "Money to Burn?" The High Cost of Energy Subsidies", the Washington-based WRI economist, Mark Kosmo, cautioned that though the declining oil prices of the early 1980s brought welcome relief to oil-importing developing countries, "the reprieve now seems to be ending".

This is because, the economist said, of the remaining subsidies for petroleum products, electricity, natural gas and coal, which continue to cost billions of dollars in economic losses annually.

As such, by eliminating or reducing remaining subsidies now, while inflation rates and oil prices are plausibly stable, countries that subsidise energy production or consumption could minimize the transition costs to more rational energy pricing and reap significant economic and environmental benefits, the study said.

The study exhorted that governments should not "sit by and do nothing since any future increases in world oil prices would make existing energy subsidies even more costly", and further strain the resource base that is vital for economic growth and development.

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The study said that in developing ountries, most energy subsidies do not benefit the poor, as wealthier house-holds and industrial users conume disproportionate amounts of ommercial energy and thereby deprive the needy of their genuine demands. It said that relying on argeted subsidies instead of general price subsidies would correct this nequity.

Allocation schemes analogous to the kerosene stamp programme in Sri Lanka or subsidies for mass transit instead of diesel fuel would benefit mainly the poor and would not spur undesirable substitutions of diesel and kerosene by trucks, wealthier house-holds, and industrial and agricultural user.

According to the WRI study, deveoping countries' share of the world's commercial energy consumption is likely to increase from 20 per cent in 1980 to 25 per cent in 1995, and they are likely to account for 95 per cent of the non-communist world's growth in oil consumption over the next decade.

Considering that non-OPEC production is likely to peak in the early 1990s, and that the importance of such smaller OPEC and non-OPEC exporters as Nigeria and Mexico would decline as a result, commercial energy subsidies, especially in the oil-exporting countries, do have "global implications" for all nations' collective energy future, the study warned.

According to the study, countries that subsidise energy consumption and production undermine all other demand-management policies that encourage conservation. Education programmes, regulatory standards and R and D in conservation technoogy should be supported to maximise energy efficiency, it said.

According to the study, subsidies for energy consumers increase unemployment by encouraging firms to substitute energy for labour. Arificially low energy prices encourage ver investment in energy-intensive industries, in turn diverting capital from other sectors of the economy where it could be deployed more productively.

PDIL DEVELOPS TECH FOR PETROLEUM REFINING CATALYSTS

Project and Development India Ltd. (PDIL) has, for the first time in the country, developed knowhow for manufacturing petroleum refining catalysts.

According to an official release the catalysts, called fluid catalytic cracking (FCC), were hitherto being imported, involving a foreign exchange outgo of Rs. 20 crores.

The petroleum industry, which consumes about 4,500 tonnes of FCC catalysts annually, should benefit from this development. The development assumes further importance in view of the fact that these catalysts can be used to process all kinds of feeds according to the specific product pattern requirements.

The catalysts developed by PDIL were evaporated abroad in a pilot plant of a major licensor of Indian refineries. These catalysts were found to be "comparable to proven commercial catalysts".

Following this PDIL was awarded a letter of intent for manufacturing these catalysts. The company has now developed knowhow for amorphous, semi-synthetic as well as zoolite-based FCC catalysts.

LEATHER INPUT DUTY CUT HAILED

The Indian Leather Products Association (ILPA) President, Mr. S.S. Sawhney, welcomed the Centre's recent decision permitting import of metallic embellishments used by the leather sector at a reduced duty of 40 per cent.

In a statement the ILPA President, however, cautioned the exporters that every care should be taken to ensure strict utilisation of these incentives for export production only.

He, however, regretted that while the relevant Government notifications were absolutely clear-cut in their contents, the customs authorities in some part of the country were "unnecessarily harassing" exporters in interpreting the nomenclature of some of these embellishments.

He appealed that metallic pullers, which are already classified as embelishments, should also be permitted to be imported without percentage limitation.

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TITANIUM DIOXIDE PROJECT

Reliance steel, Ipicol tie-up

Mr. A.K. Kanoria, director of Reliance Steels Ltd. signed on Nov. 2nd a joint venture agreement with the Industrial Promotion and Investment Corporation of Orissa Ltd. (Ipicol) for the Rs. 150-crore project for manufacture of titanium dioxide at Chhatrapur in Ganjam district.

Kerr McGee Chemical Corporation of the US, which will be the technical collaborator, is also likely to have equity to the extent of 20 per cent, Reliance 20 per cent and Ipicol a little less than 11 per cent. The total equity will be about Rs. 40 crores. Forty-nine per cent will be offered to the public.

The project, which will use synthetic rutile supplied by the sand separation complex of the public sector Indian Rare Earths Ltd., Chhatrapur, will have a registered capacity of 50,000 tonnes. But initially it is likely to have an installed capacity of 36,000 tonnes in two modules of 18,000 tonnes each, according to official sources. Foreign collaboration and capital goods import for the project have already been approved by the Central government. Out of about 160 acres of land required for the project, about 30 acres belong to the state government. Acquisition proceedings for the rest of the land are understood to have started already.

The proposed company will advance Rs. 5 crores to the public health department of the state government towards cost of building installations for supplying two million gallons per day of water from the Rushikulya integrated irrigation system. The project, which is expected to create scope for ancillary and downstream industries, will provide direct employment to about 2,000 persons. It will be the largest project promoted so far by Ipicol.

Titanium dioxide is a vital input for the paint industry and is also used in the manufacture of paper and textiles. According to one estimate, the projected annual domestic demand for titanium dioxide pigments, which have been replacing other conventional white pigments, is 80,000 tonnes per annum by 1990, while the anticipated production will be 50,000 tonnes. The Orissa Sands Complex (Oscom) of IRE when on full stream will produce one lakh tonnes of rutile including synthetic rutile needed to make titanium dioxide.

The proposed plant will be able to generate power from its process steam to meet its requirements, it is stated. The project is expected to be implemented in three years.

Mr. Kanoria also called on the chief minister, Mr. J.B. Patnaik and the industries minister, Mr. Niranjan Patnaik and apprised them of the progress of the project.

HPCL RECORDS RS. 217 CRORES PROFIT

Hindustan Petroleum Corporation Limited, one of the three major petroleum rezning and marketing companies, recorded a gross profit of Rs. 217 crores in 1986-87 an increase of 19 per cent over the previous year, according to an official release.

The corporation earned a net profit of Rs. 48.05 crores, representing more than 100 per cent increase over 1985-86.

He added that the Rs. 3493 crores sales turnover of the corporation was the highest achieved so far and showed an increase of 9 per cent over the 1985-86 sales.

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IL's and LI's issued in july

The following is the list of industrial licences issued under the Industries (Development and Regulation) Act, 1951, during July, 1987. The name of the Undertaking and the type of Industrial licence, the location, the items of manufacture and annual capacity are given in that order:

Porwal Carbide (P) Ltd., 60, HIG Hoshangabad Road, Bhopal-16 (COB); Plot No. 10, New Indl. Area, Mandideep Distt. Raisen Madhya Pradesh; Calcium Carbide, 1,500 tns.

Eastern Electro-Chemical Industries, 14, Nadir Colony, Shamla Hills, Bhopal (COB); 2, New Indl. Area, Mandideep, Raisen, Madhya Pradesh; Calcium Carbide; 1,800 tons,.

Hindustan Ciba-Geigy Ltd., 14, Jamshedji Tata Road, Bombay-20 (NA); Santa Monica, Corlim District, Jlhas Goa; Speciality hardners; 25 tons.

National Peroxide Ltd., Neville House, J. N. Heredia Marg, Ballard Estate, Bombay-38 (SE); Vadavali Taluk Kalyan, Distt. Thane, Maharashtra; Hydrogen Peroxide (35% W/W) 12,000 tons. (after expansion).

Hukumchand Jute and Industries Ltd., (Chemicals Div.), 15, India Exchange Place, Calcutta-1 (NU); Teh. Amlai, Distt. Shadol, Madhya Pradesh; Trichloroethylene; 5,000 tons.

Kanoria Chemicals & Industries Ltd., 16-A, Barabourne Road, Calcutta-1 (NA/SE); Ankleshwar, Dist. Bharuch, Gujarat; (a) Pentaerythritol (SE) 3000 tons (after expn.); (b) Sodium Formate (By-product) (NA) 1650 tons.

J.K.B.M. Ltd., 2, Mangoe Lane, Calcutta-1 (NA); Teh. Ankleshwar, Distt. Bharuch, Gujarat; Butachlor (Technical) and its formulations; 200 tons.

Modipon Ltd., Modinagar-4, Uttar Pradesh (SE); Modinagar, Distt. Ghaziabad, Uttar Pradesh; Nylon industrial yarn/tyre cord; 400 tons (after expn.).

Sandoz (India) Ltd., Sandoz House, Dr. A. B. Road, Worli, Bombay-18 (NA); Panoli, Dist. Bharuch, Gujarat; 1,2-Dihydro-2-oxoquinoxaline for captive consumption; 300 tons.

The following is a list of Letters of Intent issued in the month of July 1987:

Sandoz (India) Limited, Sandoz House, Dr. Annie Besant Road, Worli, Bombay-400 018 (NA); Bharuch Gujarat; Fluvalinate; 60 tonnes.

Ester India Limited, 75, Amrit Nagar, Behind NDSE Part 1, New Delhi-110 003 (NA), Khatima Nainital, Uttar Pradesh; Dope dyed coarse denier polyester filament yarn produced out of recycled polyester film waste; 1200 tons.

Shri Ram Fibres Ltd., Express Building, 9-10, Bahadur Shah Zafar Marg, New Delhi-110 002 (NA); Manali Indl. Complex, Saidapet, Chingalput, Tamil Nadu, Leather auxilaries (organic chemicals); 500 m.t.

Madras Refineries Ltd., 480, Anna Salai, Nandanam, Madras-600 035, Tamil Nadu (NA); Chingalput, Tamil Nadu, (a) Ashless dispersants (Succinimides) 6,300 tons; (b) Metallic detergents (Calcium Phenates) 3,000 tons, (c) Metallic detergents (Calcium Sulfonates) 4,000 tons.

P. K. Patel, 19-A, Satyawadi Society, Behind Bank of Baroda, Usmanpura, Ashram Road, Ahmedabad-13, Gujarat (SE); Mandli Mehsana, Gujarat; Sulphuric Acid; 66,000 tons.

Punjab State Industrial Development Corporation Ltd., SCO 4-56, Sector 17-A, Chandigarh-160 017 (NU); Any centrally declared backward distt., Punjab; Biaxially oriented polypropylene (Bopp) film; 2,000 tons.

C. K. Mehta Deepak Refineries Ltd., (Proposed), 10-B, Bakhtawar, Nariman Point, Bombay-400 021, Maharashtra; (a) Hysol (Emulsifying agent for water & oil); 7,00,000 ltrs. (b) FW emulsifiers (equipment); 500 nos.

Global Drilling Fluids & Chemicals India Pvt. Ltd., Sunlight Building, 1-28, Asaf Ali Road, New Delhi-110 002 (NU); Any permissable location. Gujarat; (a) Caustic lignite; 1000 tonnes, (b) Resinex equivalent; 2,000 tonnes, (c) Ferro chrome lignosulphate; 3,500 tons.

Lupin Polymers Ltd., 159, CST Rd., Kalina, Santacruz (East), Bombay-400-098 (NU); Kundaim Indl. Area, Goa, Daman & Diu; (a) Artificial leather based on polyurethane and on polyurethane and polyvinyl chloride, 40,00,000 mts.

Kaveri Lime Industries (P) Ltd., Near IBP Petrol Pump, Delhi Road, Saharanpur-247 001 (NU); Saharanpur, Uttar Pradesh; (a) Precipitated cal-

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ium carbonate, 3,000 tons; (b) Activated calcium carbonate, 500 tons.

India Brewery & Distlillery Ltd., 6-3 1089/A-3, Gulmohar Avenue, Rajbhavan Road, Somajiguda, Hyderabad-500 482 (NU); Humnaoad, Bidar, Karnataka, (a) Acetic anhydride 1,050 tons, (b) N. Butyl acetate 3,000 tons.

Pradeep Chandra Bhanjdeo, Mayurbhanj House, 3, Rainey Park, Calcutta 700 019 (NU); Kantabhanji, Bolangir, Orissa; Lime (of quality other than for construction and lime wash): 75,000 tons.

Cochin Refineries Ltd., Post Bag No. 2, Ambalamugal-682 302, Ernakulam Dist., Kerala State (NA); Ambalamugal Kunnathunadu, Ernakulam, Kerala; **Toluene; 12,000 tons.**

Polyolefins Industries, Mafatlal Centre, Nariman Point, Bombay-400 021 (NA); Thane-Belapur Road, Thane, Maharashtra; Chlorinated polyethylene; 6,000 tonnes.

West Bengal Industrial Development Corpn. Ltd., 23-A, Netaji Subhas Rd., Calcutta-700 001 (NU), Haldia Midnapore, West Bengal; Biaxially oriented polypropylene films, 2,000 tonnes.

Haryana State Indl. Development Corpn. Ltd., SCO No. 40-41, Sector 17-A, Chandigarh (NU); Mohindergarh, Haryana; Biaxially oriented polypropylene (BOPP) film, 2,000 tons.

Vam Organic Chemicals Ltd., Skyline House (3rd Floor), 85, Nehru Place, New Delhi-110 019 (NA); Hasanpur (Gujarat), Moradabad, Uttar Pradesh; (a) Pentaerythritol; 5,000 tonnes, (b) Sodium formate (Co-product); 1,600 tonnes.

Jiyajeerao Cotton Mills Ltd., (Unit: Saurashtra Chemicals), 2nd Floor, UCO Bank Bldg., Parliament Street, New Delhi-110 001 (SE); Porbander, Junagadh, Gujarat; Refined bicarbonate.

Jiyajeerao Cotton Mills Ltd. (Unit: Saurashtra Chemicals), 2nd Floor, UCO Bank Bldg., Parliament Street, New Delhi-110 001 (NU); Jamnagar Gujarat; Bromine, 450 tonnes.

The Atul Products Ltd., P.O. Atul (W. Rly.), Dist. Bulsar-396 020, Gujarat (NA); Atul Valsad, Gujarat; (a) Dimethyl Carbonate 10 tons, (b) Dipropyl carbonate 10 tons, (c) Diphenyl carbonate 10 tons, (d) Ethylene carbonate 10 tons.

Vam Organic Chemicals Ltd., Skyline House (3rd floor), 85, Nehru Place New Delhi-110019 (NA), Gajraula Hasanpur, Moradabad, Uttar Pradesh; Dimethyl formamide 5,000 m.t.

Srinath Ratnam Sun Polymers Ltd., TVS Complex, 180, Mount Road, Madras-600 006 Tamil Nadu (NU) Pondicherry; (a) Industrial coatings Automotive coatings (3,500 TPA), Can and coil coatings (500 TPA and powder coatings (500 TPA) 6500 tonnes (b) Electrical insulating varnish enamels, resins and potting compounds 5,000 tonnes. (c) Brake lining/clutch grinding wheel abrasive material/bonding resins, 1,500. (d) Synthetic sealing and bonding resins 1,500. (e) Synthetic sealing and bonding agents, 1,200 (f) Synthetic resins and intermediates 6,300.

Vihaan Films Limited, 5-9-317, Opp. State Bank Hyderabad, Gunfoundry Hyderabad-500 001. Andhra Pradesh (NU); Medak Andhra Pradesh; Biaxially oriented polypropylene film, 2,000 tonnes.

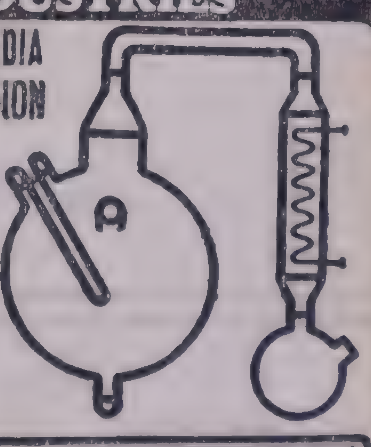
Kesar Enterprises Ltd., Oriental House 7 Jamshedji Tata Road Churchgate Reclamation Bombay 400 020 (NA); Nanoose Khalapur Raigad Maharashtra; Cephalexin monohydrate 130 tonnes.

Haryana State Industrial Development Corporation Ltd S.C.O. 40-41 Sector 17 A, Chandigarh 160 017 (NU), (a) 7-ADCA 70 tonnes (b) Cephalexin 50 tonnes.

Sandoz (India) Limited, Dr. Annie Besant Road Worli, Bombay 400 018, Maharashtra (NA), Thane Maharashtra; Pindolol and formulations thereof; 225 kgs.

Vijay Kumar Garg, House No. 115, Sector 9-B Chandigarh (NU); Dera Bassi Rajpuraa Patiala Punjab; 3,4,5, Trimethoxy benzaldehyde; 200 tonnes.

Hindustan Antibiotics Ltd., Pimpri, Pune-111 018. Maharashtra (SE): Pimpri Haveli, Pune, Maharashtra; 6 APA and Semi-synthetic penicillins, 100 tonnes.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New fertiliser marketing policy under study

The Government is working on a rational fertiliser marketing policy to avoid any overlapping in marketing by the manufacturers.

Disclosing this to newsmen, immediately, after the inauguration of the Rs. 301-crore Namrup III project, Mr. R. Prabhu, the Union Minister of State for Fertiliser, said that the Government would be carrying out an extensive study on the existing marketing policies of fertiliser manufacturers. In view of the various problems faced by the manufacturers the Government would try to formulate a model which would do away with the criss-crossing of fertiliser movement, he added.

The Minister said that solely the Government "could not allow a particular manufacturer to hold farmers to ransom". Hence the decision to have more than one supplier to each region would stay. While admitting violation of marketing norms by a section of the public as well as private sector manufacturers last year, he said that none has been blacklisted by the government. Those erring manufacturers did not violate the norms as such, but what they have done should not happen again, he said.

Mr. Prabhu said that the question of bringing in other suppliers came in [illegible] shortage cropped up in certain pockets within the region catered by a particular supplier. But this again depended on a rational demand projection made by the State Government.

The Minister, however, made it clear that the Government would not tolerate any undercutting in prices of fertiliser by any manufacturer, public or private. In reply to a question, he said that the Government would like to reduce the subsidy on fertiliser, but that would also largely depend on to what extent the cost of inputs like natural gas, naphtha, fuel oil etc could be brought down. Other measures too were being explored to bring down the subsidy. Till that was achieved the aim of the Government would be to contain the subsidy at the existing level, he added.

About imports of fertiliser, Mr. Prabhu said that in view of the comfortable stock position, the Government has decided not to import fertiliser this year. This could be gauged by the fact that compared to last year's Rs. 960 crores imports of fertiliser, the current year imports would be worth around Rs. 100 crores or so.

Earlier, dedicating the Namrup-III plant to the nation, the Governor of Assam and Meghalaya, Mr. Bhisma Narain Singh, said that there was an increasing trend in the north eastern region to use fertiliser scientifically to get a better yield. Referring to the role of various promotional agencies of the State Government and institutions, the Governor said that consumption of fertilisers was still much lower in Assam and the north eastern region than the national average. It was a matter of great satisfaction that with the doubling of the capacity of the Namrup fertiliser complex, Assam would be in a position to meet the needs of other parts of the country like north Bengal, north Bihar and eastern Uttar Pradesh.

In his welcome speech Mr. Sebastian Jacob, Chairman and Managing Director of the Hindustan Fertiliser Corporation, expressed the hope that with the commissioning of Namrup-III, the finances of the corporation would improve substantially. He said that the corporation did not fare well in the past because all the three plants which were given to HFC were older plants. The Haldia plant was also a half-complete project.

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Pesticide poisoning rate high in India

Certain limited studies conducted the Central Labour Institute in se- ted industries in the country have own a high incidence of some com- on occupational diseases with insec- ide and pesticide poisoning topp- g the list.

The percentage of incidence was .5 for insecticide and pesticide poi- ning followed by silicosis (27.6) d coal workers pneumoconicosis 8.80).

The Medical Commissioner for the nployees State Insurance Corpora- on, Dr. Ved Prakash, told an Asian gional round table meeting on 'So- al Protection Against Occupational iseases, last week that asbestosis, ad poisoning, carbon disulphide poi- oning, dermatics, noise-induced hear- g loss and byssinosis were the other ccupational diseases prevalent among orkers.

Dr. Prakash, one of the reporters r the meeting organised by the In- rnational Social Security Associa- on said the ESI Scheme did not have s own elaborate facilities now for in- stigating, diagnosing and treating cupational diseases.

The Government had now decided set up four Occupational Disease entres in four ESI hospitals at Ban- lore, Bombay and Calcutta.

The incidence of occupational disea- s reported over the years to the ESI orporation had been insignificant, though the unreported incidence ight be quite high as shown by re- nt studies.

In his report on current develop- ents in the field of occupational dis- ses with special reference to their entification and compensation, Dr. akash said specialised institutions r diagnosis and treatment were few the developing countries, which suf- r from a shortage of manpower and aterial resources.

The low level of education, poor trition, lack of sanitation and hygi- e and the prevalence of endemic di- ases added to the hardship of wor- rs.

Moreover, there was reluctance on e part of physicians to diagnose with thority an occupational disease and so a tendency to mislabel occupational lung diseases as pulmonary tuberculosis.

The reason for this appears to be lack of knowledge and training, absence of a universally acceptable criterion of diagnosis and diagnostic equipment, besides the will and immense labour required in completing the task. Industrial medicine is not even recognised as a speciality in some countries.

Dr. Prakash said even in advanced countries in the Asia and Pacific region cases of occupational diseases were reported insignificant. This in fact did not point towards the absence of a large number of cases but was indicative of the absence of a proper, organised and reliable system of collecting statistics.

Presenting a report on the 'Treatment of Occupational Diseases and Provision for Rehabilitation," Dr. Keir Howard, medical adviser of the New Zealand Accident Compensation Corporation, said in the development and improvement of existing services was the lack of trained personnel both occupational physicians and those of various disciplines involved in the rehabilitation process.

RCF SETS RECORD

Despite drought, fertilisers glut and cut-throat competition, the Rashtriya Chemicals & Fertilisers Ltd. (RCF) has scaled new heights, registering a Rs. 195-crore profit last year and a 15 per cent rise in production in the first six months of the current year, as against the corresponding period last year.

The government sector company, which contributes 15 per cent of the country's total indigenous fertilisers production, not only maintained its unbroken record of continuous profit-making since its inception in 1978, but now also proposes to diversify into petro-chemicals and communication fields to make it more viable, the RCF chairman and managing director, Mr. Duleep Singh said.

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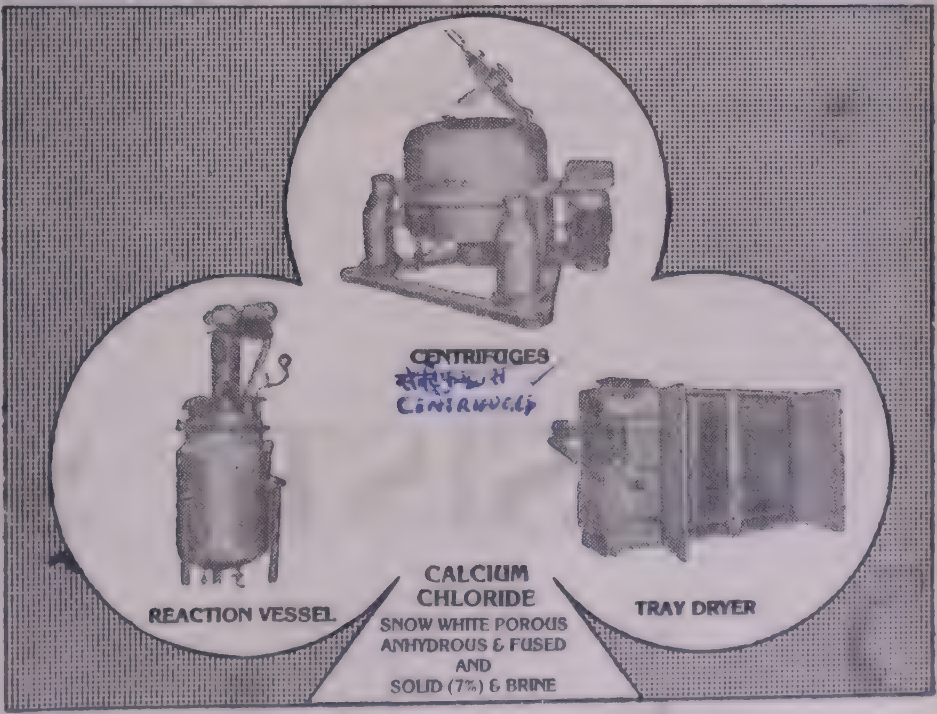

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New way to tackle sugar unit pollution

An ecological calamity is lurking behind the affluence that the sugar industry has brought to the rural areas in western Maharashtra. The threat is from the milllions of litres of spent wash discharged from about 100 sugar factories in the region. While the effect of the effluents on the environment is getting increasingly evident, the available methods to treat them are inefficient and costly. They are also causing undesirable side-effects.

A widely-used method for controlling pollution is by treating large volumes of spent wash anaerobically in ponds. This not only produces an abominable stench, it also contaminates the ground water. Another method. burning the wash in incineraters involves a high energy consumption and is not economically viable.

In this backdrop, the experiments conducted by Shivadasan Griha Nirman Society Ltd. to find an economically viable method to treat the spent wash has assumed significance. This new method, while curbing pollution, produces useful biogas and organic manure and purifies water. In effect, it provides a self-sustaining system to give a total solution to the pollution threat posed by these sugar factories.

The method involves the anaerobic digestion of spent wash to produce biogas which can be used as fuel in the factory boilers. The slurry is allowed to settle. The supernatent is then adequately diluted and fed into specially-constructed ponds for cultivating water hyacinth. This is to purify the water. The water thus purified is chlorinated and recycled for industrial use. The water hyacinth is chopped then mixed with the sludge from the settled slurry to get a rich compost which can go back to the sugarcane fields.

The biomethanation plant is situated near the factory boiler room, and the water hyacinth treatment ponds on waste land near sugarcane fields. The entire method is envisaged as a natural and harmonious process of recycling liquid waste.

A mill discharging about 500,000 litres of spent wash daily can generate through such a plant about 15,000 cubic metres of biogas daily, providing fuel for the boilers for about seven hours. The method will also save bagasse from being burnt in boilers resulting in fly-ash pollution. Moreover, the valuable bagasse can be collected for use in paper industry.

The plant will produce about 21,000 tonnes of organic manure annually which can enrich the sugarcane fields. And the purified water can be recycled for industrial or agricultural use.

The society estimates the expenditure involved in setting up a plant to treat 7,000 litres of spent wash daily at Rs. 23 lakhs. A spokesman of the society says the laboratory studies on it have been satisfactory. He says it is possible to reduce the cost of the plant while implementing the project.

It is heartening to visualise sugar factory chimneys free of fly-ash pollution. This and expansive ponds with swaying water hyacinths will complete the setting for a sugar mill in future.

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SC panel minority indicts Carbide

Fresh evidence of continuing presence of toxins in the bodies of Bhopal gas victims has been reported to the supreme court by a committee appointed earlier by the court.

Confronting the claims of Union Carbide, the minority members of the supreme court committee, claimed to have brought out major changes in the very nature of compensation against Union Carbide.

The two representatives of the committee, Dr. Sujit Das and Dr. Anil Sadgopal, said the finding of toxic exposure leading to a rise in the urine thiocyanate level need not necessarily imply cyanide poisoning. In fact, the MIC itself could have entered the blood stream and persisted inside the body.

Dr. Dass said that the research projects of the Indian Council of Medical Research (ICMR) have not "even explored the toxic role of MIC remaining in the body and its possible links with the excretion of thiocyanate in the urine. Union Carbide has suppressed scientific information on this matter."

Statements were collected by the team from the investigators of the department of endocrinology and metabolism of the AIIMS, New Delhi. Dr. Sadgopal informed that the investigation, though carried out under the aegis of the ICMR, the project was terminated by the latter prematurely. Consequently, the last urine samples collected from the gas victims were in March 1987.

Even as late as in March 1987, about 25 per cent of children and 37 per cent of adults were found to be excreting abnormally high amounts of thiocyanate. The report claimed that this "clearly signifies the remaining of poisonous chemicals in the body for a long time after the tragedy."

The report further claimed that this finding should have been in light of "hitherto neglected evidence of MIC entering the blood stream, reacting with haemoglobin, generating specific antibodies and disturbing the immune system."

"Particularly alarming is the pregnancy outcome study, conducted by the Medico Friend Circle, which established that the spontaneous abortion rate has increased almost four-fold. As a result, gas exposure and toxins present in the bodies of gas-exposed women are causing damage to the foetus for several months if not more."

A recommendation made in this regard by the committee to the supreme court said the government may be asked to set up a special implementing agency for monitoring the toxicological status of the gas victims.

It also recommended that the Union Carbide Corporation and Union Carbide India Limited may be directed to immediately disclose all information in their possession regarding the chemical composition of the toxic emission from the Bhopal plant and the toxicology of the MIC and all its products of exothermic reaction and thermal decomposition.

Calling upon the ICMR for all possible support to the investigating scientists, the committee asked for conducting a periodic monitoring of urine thiocyanate levels of the gas-exposed population in an epidemiological perspective.

The giant research network like the CSIR and the ICMR need to be persuaded to allocate the high level of scientific competence already available in the country for such an important task.

Public opinion would be mobilised to ensure that the gas victims' interests were not compromised in the compensation case without taking into account the enormous and long-term financial responsibility that befalls Union Carbide as a result of emerging scientific evidence of persisting toxicity and its hazards, they added.

The former supreme court judge, Mr. P. S. Poti, and two others have appealed to the Prime Minister, Mr. Rajiv Gandhi, not to yield to any pressure for settlement of the Bhopal Gas victims' compensation from Union Carbide.

In an appeal, the signatories who also included Dr. Lotika Sarkar, national fellow, and Prof. Upendra Baxi of Delhi University's law faculty, said: "The Bhopal case is not only about money."

'Rather, it aims to vindicate a principle of law and justice of global significance: multinational enterprises engaged in hazardous activity must be strictly liable in law", they said

The Bhopal gas compensation settlement case is to be heard on October 30.

The signatories said, "The Indian government has in the past consistently and rightly refused all settlement overtures. It has qualified claims of victims as over three billion dollars."

"This amount represents the government's own realistic assessment of the damage caused by the Bhopal catastrophe and costs of compensation and rehabilitation of the victims.

"Any settlement far below this amount will be unjust. But given Union Carbide's past positions, it is unlikely to agree to any but the most woefully inadequate settlement amount.

"Any settlement at this stage will amount to a tragic betrayal of tens of thousands of people who suffered and continue to suffer in Bhopal," they said.

"We appeal to the Prime Minister not to yield to any pressure for settlement of the case. Any settlement must follow, not precede, the determination of legal liability of Union Carbide," they said.

NICKEL, TIN & COPPER PRICES HIKED

The Minerals and Metals Trading Corporation has steeply increased the prices of nickel, copper and tin.

The increase of Rs. 13,000 in price of nickel, of Rs. 6,000 in that of copper and of Rs. 2,000 in that of tin will be effective from November one until further notice, says a release of the corporation issued in New Delhi on November 2.

The prices of copper, tin and nickel were increased due to rise in international prices and or appreciation of pound sterling and US dollar vis-a-vis Indian rupees.

The selling prices, ex-godown, for all categories of users (in Rs., per tonne): Electrolytic copper wire bars/high grade cathodes 67,000, continuous cast copper wire rods 75,500, electrolytic high grade zinc 31,000, pig lead 99.97 per cent purity 21,500, pig lead 99.99 per cent purity 21,700, tin 1,95,000, nickel briquettes 1,65,000, nickel squares 1,65,000, nickel pellets: F shots/strips 1,67,000, antimony metal 70,000

Potassic fertiliser unit in Gujarat

For the first time in India, a commercial plant to produce potassium shoenite, is being set up at a major salt work in Saurashtra with an annual capacity of 3,000 tonnes (10 tonnes per day).

It would operate on the process developed by the Central Salt and Marine Chemical Research Institute (CSMCRI) at Bhavnagar.

Disclosing this the Director, Dr. M. M. Taqui Khan, said the scientists at the Institute have developed a process for the recovery of pottassium fertiliser compounds from bitterns, a byproduct of the salt industry, which till recently was thrown back into the sea.

The sea bittern is the richest and the only source of potash available in the country, according to the scientists of CSMCRI. Presently the country's entire requirement of potassium is about 1.66 million tonnes (mt) and is imported. More than 60 per cent of the salt production in the country is from Gujarat.

The concentration of potassium is built up almost 300 times in the bittern. This is further evaporated under controlled conditions and a solid evaporite fraction known as mixed salt containing 18-20 per cent potassium chloride is obtained. This mixed salt forms the basic raw material for the recovery of potassium.

"The potassium component of the mixed salt can be recovered either in the form of pure fertiliser grade (technical grade potassium chloride) or as potassium shoenite — a double sulphate of potassium and magnesium", according to the scientists. CSMCRI has developed processes for both these products while the process for shoenite has been scaled up.

The availability of bittern has certain constraints. It has been established that one tonne of bittern can be obtained for every tonne of salt produced. The current salt production in the country is about eight mt and is likely to reach 15 mt by the turn of the century. Thus theoretically 15 mt of bittern would be available.

"However, since the salt production is almost equally distributed amongst the large, medium and small sector, the practical recovery of bittern may not be more than eight mt.

Moreover, even if the entire bittern thus available is processed for recovery of potassium chloride only about 1.6 lakh tonnes would be recovered, which is just 10 per cent of the total requirement of the country", the scientists said.

"Despite the above constraints, it is essential to establish our own facility for the production of potassium chloride as it is the only raw material for the production of strategically important chemicals like potassium nitrate, potassium chlorate", Dr. Khan said.

NEW DRUG FOR HYPERLIPIDAEMIA

A new drug, the first of its kind in the world, using indigenous technology has been developed by the Central Drug Research Institute (CDRI) to combat the condition of hyperlipidaemia, which is a major risk factor in coronary heart disease.

Dr. (Mrs) Swarn Nityanand, heac of clinical and experimental medicine CDRI, speaking at a symposium or hyperlipidaemias organised at Bomba on 31st October to mark the launc of the drug, 'Guglip', manufactured b CIPLA Ltd, said Gugulipid (the activ ingredient of guglip) was found to b completely safe and devoid of any ac verse effects on body systems.

She cited findings of clinical stu dies which established the safety an efficacy of Gugulipid.

Gugulipid is extracted from Gu gul, the gum of the plant 'Commipho Mukul', found abundantly in the fores of Gujarat, Rajasthan and Karnataka.

Gugul's usefulness in lipid disc ders has been described in detail classical texts on ayurvedic medicin The development of Guglip, the fi 'allovedic' drug marks the dawn of new era of sophistication in the the peutic application of natural produc

The symposium was chaired by R. D. Lele, chief physician and ch of nuclear medicine, Jaslok Hospi a CIPLA release stated.

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FACT AMMONIA-UREA PROJECT:

Concern over centre's move

General concern in Kerala over the reported move by the Centre to deny the public sector Fertilisers and Chemicals Travancore Ltd. (FACT), the proposed Rs. 385-crore ammonia-urea complex and to give it to Madras Fertilisers Ltd. was reflected in the State Assembly.

Replying to a submission by a Congress (I) member, the Chief Minister, Mr. E. K. Nayanar, called for an effective campaign cutting across political differences to wrest Kerala's claim for the project which had been hanging fire with the Centre for a couple of years. He informed that the State Government had taken up the case with the Centre when the Union Industry Minister, Mr. Vengal Rao, visited the State recently and also when the State Industry Minister, Mrs. K. R. Gouri, called on him in New Delhi later.

The State Government had also writ- en to the Centre several times n this regard. In a reply to one f these letters the Union Industry Mi- ister had informed that the proposed mmonia-urea project of FACT would e included in the Eighth Plan.

However, when the State Industry Minister met Mr. Rao recently in New Delhi his stand was that the Centre ould consider the ammonia-urea project only after the completion of the caprolactam project now under imple- entation by FACT.

Mr. Nayanar told the House that e ammonia-urea project was inevita- e for FACT as all its plants with 15 20 years vintage had to be repla- ed. He also said there was the pos- bility of labour displacement when e caprolactam project involving so- isticated machinery would be com- issioned. The labour could be ac- mmodated only if the ammonia-urea oject was cleared, he added.

The Chief Minister disclosed that espite the Union Industry Minister's surance in Trivandrum early this ar that FACT would get the ammo- a-urea project, there had been reports at the project was being diverted to adras Fertilisers and hence FACT as likely to lose it. This had to be erted in the interests of FACT and e State and hence FACT's case ould be taken up by all irrespective of political differences, the Chief Minister said.

ONGC (ER) OUTPUT TARGET AT 4.1 M.T.

Oil and Natural Gas Commission (ONGC) has set a target of producing 4.1 million tonnes of crude oil annually from the eastern region oil fields by the end of 1990.

An ONGC spokesman said that ONGC produced 2.68 million tonnes of crude oil from the year 1986-87 as against a meagre 4.2 lakh tonnes produced in 1980-81, recording a phenomenal increase of 53 per cent during the last five years. During the year ONGC supplied 112.5 million cubic metres of natural gas to Assam State Electricity Board, Namrup unit of HFC and various tea gardens in upper Assam.

According to the spokesman, during the last six years ONGC has discovered additional reserve of 136 million tonnes of gas in the eastern region.

ONGC has also set a target of producing 10.1 million tonnes of crude oil by the year 1990 from the onshore oil fields in the country of which 4.1 million tonnes will be from the eastern region fields.

Meanwhile an assessment made by the ONGC has projected a potential production of 19.2 million tonnes of crude oil annually from onshore oil fields of which eastern regions share is projected to be 10.2 million tonnes.

From March this year, ONGC supplied natural gas to Tripura State Electricity Board at the rate of 70,000 cubic metres per day.

The spokesman added that another remarkable achievement of ONGC has been that a three-pronged strategy in cost control adopted in a saving of Rs. 200 crores during the year 1986-87.

In view of the emergence of natural gas an important substitute of oil, ONGC has been envisaging a plan to establish a national gas grid. ONGC is at present producing 9.81 million cubic metres of natural gas and it will jump to 14.91 billion cubic metres by the year 1990.

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IMPORTED DAP FOR RABI SEASON:

FAI flays govt. desision

Fertilizer Association of India has taken strong objection to the government's decision to release the imported diammonium phosphate (DAP) during the current rabi season.

The government decision goes directly against its own commitment to the fertiliser industry that no imported fertiliser would be released to the market during the current year in view of the severe fertiliser glut.

Domestic DAP units are already carrying an unsold stock of about four lakh tonnes of DAP. FAI is of the view that if at all government wanted to release more DAP it should have released more of indigenous DAP instead of the imported material. That would have given some relief to the domestic DAP units. The total domestic production of DAP is sufficient to take care of the entire requirement of 18 lakh tonnes of this fertiliser.

Industry sources point out that the government decision to release more of imported DAP is also going to hit fertiliser units making single superphosphate.

Almost 60 per cent of SSP units are remaining closed for many months because of the glut.

The plight of the glut ridden fertiliser industry had become worse with a government order in last September directing fertiliser units not to sell more than 60 per cent of the total production during the rabi season starting from October 1. The government had also directed fertiliser units not to sell more than 85 per cent of the opening stocks held by the fertiliser units as on October 1.

Although the total consumption of nitrogenous, phosphatic and potash fertilisers is expected to be marginally higher during the current rabi season at five million tonnes as against the previous year's rabi consumption of 4.8 million tonnes, the overall fertiliser consumption in 1987-88 will be lower at 8.6 million tonnes against 8.9 million tonnes in 1986-87, because of lower kharif consumption this year.

The likely increase in the consumption of fertiliser in the current rabi season is attributed to better rainfall in Bihar, Uttar Pradesh, West Bengal, Punjab, Haryana, Maharashtra and parts of Andhra Pradesh and Karnataka in August and September. The government has therefore decided to push up the rabi consumption upto 5.3 million tonnes, the sources said.

Meanwhile, the production of nitrogenous and phosphatic fertilisers is expected to be 7.65 million tonnes in 1987-88 as against a production of 7.06 million tonnes in 1986-87. With an opening stock of 2.5 million tonnes of indigenous fertilisers and two million tonnes of imported fertilisers the total availability of fertilisers this year would be 12.15 million tonnes.

WHO WILL BEAR THE LOSS?

The **Financial Express** comments editorially:

The scenario for marketing fertilisers, the availability of which including imports continues to exceed demand, remains a murkey one, reflecting a singular lack of clarity of objective. For the coming rabi, farmers are to be supplied imported DAP (phosphatic fertiliser) becausa of its inadequate production by domestic fertiliser units. It is of course true that DAP output has not been adequate and farmers need to be supplied phosphatic fertilisers for the basic dose fairly early in the rabi season. However, the lag in DAP output was caused by the non-availability of phosphoric acid which is imported. For reasons best known to government there seems to be a bunching of imports of phosphoric acid which begins at the end of October. DAP output will flow out of the fertiliser factories from December by which time the bulk of the DAP consumption for the rabi would have been completed. This would mean, according to the industry, that DAP producers would have to nurse the stocks of finished product for months. This follows from the fact that instead of imports meeting the gap between domestic production and demand, domestic DAP production is required to meet the gap between imports and demand.

The government over-imported fertilisers in 1986-87 and has had to effect some imports of NPK this year too to fulfil previous contractual arrangements. Judging from ths policy in respect of DAP, the domestic fertiliser industry, which has faced a bad kharif this year, has good reason to worry about its fate. In 1986-87, manufacturers had to offer discounts which added up to an estimated Rs. 40 crores of additional selling expenses not covered by the retention price scheme. The fertiliser industry can ill-afford to take a knock of a like order in 1987-88.

The industry has been talking, among other things, about holding imported fertilisers in an official reserve stock, reimbursing the industry's cost of nursing unsold stocks, working out a rational marketing policy, and reducing the overall transportation need of fertilisers through a reduction in the need for imported fertilisers. There is no point in dismissing all this as special pleading. It stands to reason that the government takes at least part of the losses arising from its decisions. In time, the policy objective should be to help the fertiliser industry to tide over the problem that has been aggravated by drought.

'SACKS INDUSTRY NOT EVADING EXCISE DUTY'

The All-India Flat Tape Manufacturers, Association (AIFTMA) has refuted the charge reportedly made by the spokesman of the Indian Jute Mills Association (IJMA) that the plastic woven sacks industry was evading duty.

In a statement issued by AIFTMA, its secretary, Mr. G. C. Dhingra, said in the budget for the current year, the finance minister proposed 30 per cent excise duty on HDPE fabric laminated with LDPE. "Strangely enough, while proposing this duty, no revenue gain was estimated".

Mr. Dhingra said, "the AIFTMA took up this issue of excise duty on fabric with the Central board of excise and customs, who realising the blunder it had made, issued an amendment whereby duty of 30 per cent was exempted only if the fabric was used for the manufacture of plastic woven sacks. For any other use, 30 per cent duty had to be paid on the fabric.

AIFTMA, moreover, pointed out that excise duties on this industry were "unparalleled" in that the duties had been imposed on all levels of production with no small industry benefits and facilities of Modvat.

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Bhuvanagiri oil found to be rich in petrol

An analysis of the oil discovered at e Bhuvanagiri II structure, 10 km rth-west of Chidambaram, in South rcot district of Tamil Nadu in the auvery onshore basin, following the xploration by the Oil and Natural as Commission (ONGC), shows that is rich in petrol and kerosene. Sam- es of the oil which are yellowish are sually very different from the oil om the Narimanam wells and said contain 40 per cent gasolene (pet- l), 28 per cent kerosene and 11 r cent light diesel oil and the re- aining are vacuum distillates and eavier fractions.

An analysis of the gas flowing at the te of 52,000 cubic metres a day om the Bhuvanagiri well shows that has a very rich content of liquefied troleum gas (LPG) and its composi- on is ethane 73.95 per cent, propa- e 9.7 per cent, butane 8.4 per nt and the remaining is isobutane d other fractions. Its calorific value also said to be high at 11,900 kilo- lories per cubic metre.

Continuous fluorescence :

A promising feature of the oil from e Bhuvanagiri well which was drilled om a depth of 4,795 metres, is id to be that there was a "continu- s fluorescence" (presence of oil) up- 350-360 metres unlike in the well illed elsewhere in the country. nother point is that the ONGC is now oducing oil and gas only from a -metre long column at a depth of 660 metres in what are known as e third and fourth zones to avoid in- sion of water and other non-oil sub- nces. The quality of the Bhuvana- i oil indicates that the Ariyalur- ndicherry depression in which the huvanagiri formation is located had nerated considerable quantity of oil d is the oldest among the prospec- e oil-bearing regions, dating back 100 million years. This is the first ne that oil has been produced from ch a very old formation, it is stated.

The oil flow of 206 barrels a day mes through a choke having a dia- ter of 12/64 inches. The flow rate uld have been higher if a higher dia- ter choke was used, but a higher w would have brought down the ssure. It has also been stated that Narimanam wells which have been yielding for more than a year have maintained a constant pressure of 750 pounds per square inch (psi) and the oil is flowing through a 8/64 inch choke.

Prospects of mini-refinery :

The prospects of setting up a mini-refinery in Thanjavur will depend upon the ONGC succeeding in its efforts to step up its production from the Cauvery onshore and offshore areas to half a million tonnes a year, according to the target it has set. Those to whom the ONGC is now supplying gas from the Krishna-Godavari basin are using it as fuel. A joint task force of the ONGC and Madras Refineries is now examining the best ways of utilising the oil and gas being produced from the Cauvery and Krishna-Godavari basins. The prospects for the ONGC setting up a fractionation plant and supplying gas to manufacturers of fertilizers will depend upon its making more discoveries of oil and gas in the two basins and stepping up its production of gas to as much as three million cubic metres a day. The Nagarjunasagar Fertilizers which has a capacity for manufacturing 900 tonnes of urea a day has indicated to the ONGC that it needed a million cubic metres of gas for fertilizer production and 0.3 million cubic metres for its power and fuel needs.

MGR's suggestion to TNEB :

Tamil Nadu Chief Minister, Mr. M. G. Ramachandran, has asked the State Electricity Board to explore the possibility of setting up gas and furnace-oil based power generation units utilising the hydrocarbon finds at Bhuvanagiri.

Mr. V. V. Swaminathan, Minister for Information, said that samples of the Bhuvanagiri oil were shown to the Chief Minister. As the gas flow rate at Bhuvanagiri was reported to be high the Chief Minister wondered whether a five MW gas turbine could be set up to generate power.

The Minister said that Mr. Ramachandran also asked him whether a 100 MW power generation unit could be set up directly using the Bhuvanagiri crude, stated to be of high quality with a rich gasolene content.

Asked whether it was possible to use the oil without refining, Mr. Swaminathan said that in the Arab countries such units existed.

The ONGC would start drilling for oil and gas at Sathapadi, near Bhuvanagiri on November 15, he said.

UTILISATION OF GAS ASSETS URGED

Mr. A. P. Dhande, Chairman, Maharashtra State Electricity Board, has appealed to energy planners to pay more attention towards utilisation of vast natural gas resources available in the country for augmentation of power.

He was speaking at a seminar organised by Bharat Heavy Electricals Ltd. and the General Electric of the US on gas turbines.

Mr. Dhande said that electricity generation based on gas which at present was only considered on a limited scale, should be given more importance as huge quantities of natural gas resulting from the intensified operations of ONGC, Oil India and GAIL, were available.

The 20-year conceptual plan of ONGC placed the gas generation at 46.57 million cu.m. per day by 1990-91, 76.71 mcmd by 1995-96 and 101.86 mcmd by 2000-01. The major availability of gas at present was from the associated oil and gas fields of Bombay High offshore at around 20 mcmd.

Besides these, gas would be available from many other locations including Cauvery and Krishna-Godavari basins. Huge quantities were available in the Tripura region and it was proposed to create a grid in the eastern and north eastern region.

Further, conceptual plans had been drawn for utilisation of the huge anticipated gas availability through creation of a national gas grid, he said.

BHEL could play a vital role in energy transformation by supplying equipment in short deliveries to meet the immediate needs of the country, he added.

Mr. B. S. Samat, Chairman and Managing Director, BHEL said that like any other organisation of international repute, BHEL was responsive to the changing requirements. Availability of natural gas resources, need for shorter gestation periods for power plants and several other techno-economic considerations led to the conclusion that the country needed gas turbine-based power plants.

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COMPANY NOTES

Bakelite Hylam Limited

The following are extracts from the Directors' Report :

On the export front your Company bettered the previous year's performance by registering an increase of over 58%. Though your Company continues to lead in the export of laminates it has to meet stiff competition in the international markets for Copperclad laminates.

The year under review was plagued by severe shortages of essential raw materials such as Maleic Anhydride, Styrene and Phenol.

Production during the year was sustained despite one of the worst power situations faced by your Company due to total un-nnounced cut imposed by the Andhra Pradesh State Electricity Board from 10th to 15th April nd a sixty per cent cut there-fter which continued for the remaining part of the year. Captive power generation accounted for a major spurt in the operating osts. The energy quota fixed or your Company during the pe-iod of power cut was worked ut by the State Electricity Board n an erroneous base — without aking cognisance of an error in meter recording — and repeated epresentations of your Compa-y to the Board was of no avail s a result of which your Com-any had to incur unavoidable dditional expenditure by way of iring of generators to sustain he needs of the esteemed custo-ers.

Your Company's Formaldehyde Unit continues to suffer as e Government of Andhra Pra-esh continued the levy of Excise Duty on Methanol inspite of your Company's repeated representations.

Expansion Project

Your Company successfully commissioned the Glass Epoxy Copperclad Laminates Project during the year and production runs were taken in the month of March, 1987. However, due to severe power restrictions and non-availability of Glass Fabric of the desired quality to meet the exacting requirements of PCB manufacturers your Company could not put the plant to optimum use during the remaining part of the year. In this regard your Company has made an application to the Government of India for allowing import of Glass Fabric of the desired quality which is pending approval.

Phenolic Foam Project

During the year under review Capital Goods Clearance was received for the import of continuous plant for the manufacture of Thermal Insulation Foam based on Phenolic Resin on a commercial scale. Your Company has taken effective steps for setting up the project in Nacharam near Hyderabad and the project is expected to be on stream towards end of next year.

Research and Development

Your Company continues the emphasis on research and development efforts to ensure that your Company remains a leader in the country in Thermoset Technology. The Department of Science and Technology has accorded renewal of the recognition granted to your Company's R & D Centre.

The significant developments during the year under review include introduction of an improved version of Copperclad Laminates for PCB application with fire retardant characteristics, Polyester Resins for Filament Winding applications and Moulding Materials for self-lubricated water seals.

ULTRAMARINE & PIGMENTS LIMITED

The following are extracts from the Directors' Report :

Production, Sales & Profit :

Production of Ultramarine Blue was marginally lower during the year under review compared to the previous year due to disruption in the supply of an important raw material due to labour unrest in the supplier's plant.

Another important reason for the decrease in production of Ultramarine Blue was the deplorably low quality of coal and coke. The essential requirement for the development of chemical industry is coal and electricity. The ash content of Indian coal can be as high as 40%. The supplies of coal from the public sector contain a large percentage of dust and stones.

With careful and efficient use of the available resources, however, the cost of production was kept low.

The Detergent Unit also has made a modest contribution to the profits of the Company due to better utilisation of the installed capacity.

High Density Polyethylene Woven Sacks Unit :

The construction of the Unit was completed in time and production started.

Under the pretext of protecting the jute farmers and reviving the jute industry, the Government of India imposed Excise Duty at Rs. 4.05 per kg. on HDPE tapes (an intermediate product) and an additional duty of 12% on woven sacks, thus making HDPE woven sacks costlier than jute bags. The increase in cost due to levy of Excise Duties could not be passed on to the customer as HDPE Woven bags is outside the scope of MODVAT benefit.

Not being content with this, the Government passed a legislation making it mandatory for food grains, sugar, fertilizer and cement factories to use jute bags for 100%, 50% and 70% of their production, respectively. This is inspite of the industries and the consumers preferring the use of synthetic bags to jute in view of the intrinsic advantages of the former.

Representations are being made to Government by the associations and it is hoped that the Government of India will relax the restrictions to ensure that synthetic woven bags industry, set up at a cost of over Rs. 500 crores, does not turn sick and close down.

The current year has begun well. Production in Detergent Units during the first quarter have been on par with those of the previous year. The new Unit of Ultramarine Blue has also gone into production. This should result in increased production, sale and profit of the Ultramarine Blue Division. Supplies of Linear Alkyl Benzene are likely to be freely available in the near future with the Tamil Nadu Petroproducts Ltd. scheduled to commence production of this chemical shortly. This should improve the prospects of the detergent industry.

Barring unforseen circumstances, the performance of the Company during the current year can be expected to be at least as good as the previous year.

The Company exported Ultramarine Blue during the year to U.S.S.R. West Africa, Sri Lanka and Bangla Desh and earned about Rs. 117 lakhs in foreign exchange on f.o.b. basis against Rs. 95 lakhs during the previous year. The Company has secured large export orders for Ultramarine Blue during the current year also.

ALEMBIC CHEMICAL WORKS CO. LTD.

Operations :

The Company's sales are Rs. 66.24 crores for the 12 months ended on 31.5.1986 as comparto Rs. 64.18 crores for the previous period of 17 months ended on 31.5.1985. The Company has made profits as compared to losses incurred for the respective periods. The figures are not comparable as the figures for the year ended 31.5.1986 include figures related to erstwhile Seomer Ltd., and the figures of previous period of the company are pertaining to the period of 17 months.

The sales for the year 1985-86 would have been still higher, but for the inadequate supply of certain important raw materials like streptomycin, cephalexin, noscapine, etc. which in turn has adversely affected the supply position of our formulations such as Alcephin, Ephedrex-N Capsules, Bistrepan group of injections and streptomycin injections, etc. Further, the market situation as a whole for pharmaceutical products was not quite satisfactory in the later half of the year ended on 31.5.1986.

The Company has embarked upon introducing new products like Ethambutol, Ibuprofen and Salbutamol. There are also plans for introducing other products in the market in the current year 1986-87. The company is proposing to enter the fast expanding veterinary and animal health products market in the current year and the plans and programmes in this regard are under way.

The Company has also received permission from the Government to raise the licensed production capacity of Penicillin from the existing level of 100 MMU per annum to 1000 MMU per annum, Erythromycin from 30 M.T. per annum to 50 M.T. per annum, and 6-APA from 20 Tons per annum to 100 Tons per annum, under the scheme of Minimum Economic Scales of Operations and the same is under implementation. This expansion would give growth opportunity to the Company.

The erstwhile Neomer Ltd. has licensed capacity to manufacture 6,000 M.T. Polypropylene staple fibre. In addition to this, the esrtwhile Neomer Ltd. is registered with D.G.T.D. for the manufacture of 1000 M.T. per annum of Polypropylene Multifilament yarn. Under the new broad banding policy, the said erstwhile Neomer has obtained permission to manufacture other synthetic filament yarn i.e. Polyester and yarn/tyre cord. The necessary Nylon yarn including industrial formalities for purchase of required machineries to manufacture multifilament yarn are under process.

GUJARAT ALKALIES & CHEMICALS LTD.

Year in Retrospect :

Production of Caustic Soda has increased to 96,000 tonnes from 89,325 tonnes last year, an increase of approximately 7.5%. The capacity utilisation, therefore, was 93% as against the industry average of 67%. The Company faced severe competition in marketing Caustic Soda Lye and Chlorine throughout the year. In a highly competitive Caustic/Chlorine market your Company has been able to achieve higher volume of sales through aggresive marketing strategies. We have also improved our net realisation per tonne of Caustic Soda.

The production of Sodium Cyanide has also increased during the year to 1410 MT against 1369 tonnes last year. The realisation has also improved considerably.

The Chloromethanes Project which was commissioned towards the end of the year ending March, 1986 has worked for the full year. The capacity utilisation has been increased from month to month. The average capacity utilisation during the year was 42%. The total production was 4392 tonnes.

The Caustic Soda concentration and Flaking Unit has also been commissioned at the end of March, 1987. The product is well received in the market. This will enable our company to be more flexible in production planning and meet the fluctuations in he market demand.

Exports :

The Company has made vigo-ous efforts to secure export orders. Your Company has been ble to export Sodium Cyanide nd Chloromethanes to countries ike Australia, Dubai, Netherands, Phillipines, Taiwan, Sou- Korea, West Germany, Malayia, Japan and USSR.

The Company was able to exort 419 tonnes of Chlorometha-es and 131.6 tonnes of Sodium yanide. The Company has seured much larger orders for exort of Chloromethanes in 1987-8.

Energy Saving Device and Pollution Control Measures :

Your Company's efforts to improve realisation and reduce cost of production have been greatly affected by continuously increasing electricity tariff. As against average cost of power, which was 77 Paise per KWh. in 1985-86, we have paid 97 paise per KWh. in 1986-87. The total additional payment on account of power, over 1985-86, has been Rs. 680.51 lakhs in the year under report. So far as Caustic Soda industry in the country is concerned, power rate imposed on us is the highest. The Company expects to achieve a major breakthrough in reduction of power cost by adopting membrane cell technology. This saving in power consumption will substantially enhance the profitability in the Company.

It has been decided to install salt washery, which will upgrade the quality of salt which is available in the country and will result in saving in salt purification cost and will considerably reduce mercury pollution also.

Projects on Hand :

The Soda Ash Project and Cold Box Project including Second Photochlorination Unit in respect of Chloromethanes Project are on hand. The plants and equipments are likely to be received during the second quarter and both these plants are likely to be commissioned in the 1st quarter of the year 1988.

The work regarding Captive Power Plant of Gujarat Industries Power Co. Ltd., in which your Company is also participating along with Gujarat State Fertilizers Co. Ltd., Gujarat Narmada Valley Fertilizers Co. Ltd., Petrofils Co.-op. Ltd. etc. is also in progress and it is expected to go according to schedule.

New Projects :

Your Company is proposing to produce super dense variety Soda Ash, Caustic Potash & Potasium Carbonate as insurance projects to meet with the fluctuating demands of Caustic Soda, market. Your Company is also examining the feasibility of diversifying to the surfactant detergent line by establishing a unit of Secondary Alkane Sulphonate. Your Company is also planning to participate in Gujarat Petrochemicals Complex which is expected to be taken up shortly.

SYNTHETICS AND CHEMICALS LTD.

The following are extracts from the Chairman's speech at the AGM held on 11.9.87.

Recovery in Working Results :

From the Directors' Report, you will be happy to note that your Company's production of Styrene Butadiene Rubber (SBR) which had dropped to a low level of only 14,397 MT in 1982 gradually picked up and has increased to 31,565 M.T. during the eighteen-month period, October 1985 to March 1987, the sales also went up keeping reasonable pace with production. The sluggish tendency during the earlier years was due mainly to two factors : first, an unviable price coupled with erratic supplies of alcohol, the principal input; and second, the competition from SBR imported at dumping prices at the time when it was on OGL. Your Directors took decisive action by reorganising the management, placing it under the leadership of Mr. Sursh Kilachand as Managing Director. He lost no time in taking steps, firstshifting the raw material base of ly, to stabilise production by our Bareilly plant from the precarious supplies of alcohol to petrobutadiene, which it has been possible to import either duty-free or at a concessional rate of duty by making effective representations to Government; and, secondly, to improve sales by getting SBR removed from OGL and placed in the Restricted Imports List, Appendix-III.

Many other effective steps have also been taken to improve the efficiency of operations and to ease the stringency of working capital side by side with the securing of long-term finance for capital expenditure. In the result, production at Bareilly approached capacity level and sales reached satisfactory levels by the end of 1986. The resulting profitability as reflected in the accounts for the period under report is for all to share : the patience and perseverance of our Shareholders have thus been rewarded, though belatedly, through the higher Dividend the Directors have been able to recommend as also the appreciation of our Share prices from a level below par to the record level of Rs. 335 which has been touched recently. I may also invite the attention of our Shareholders to the creation of a Revolution Reserve of Rs. 32,82,59,000 in the wake of revaluation of the Company's land, buildings and plant and machinery by a Government-approved firm of valuers. I am sure you will appreciate that the Company has now been placed on a sound financial and technological foundation, thanks to efforts put in by the present management, ably supported by the active participation of our workers and other staff.

Expansion and Diversification

The Directors' Report for the period under review refers to the expansion and diversification programme of the Company. The expansion from 30,000 to 80,000 MTPA of SBR and 9,000 to 24,000 MTPA of Styrene is expected to be completed in phases within about three years, that is by 1990. Negotiations with machinery suppliers are in an advanced stage, and a final decision to make the most appropriate choice from out of the worldwide offers so far received will be taken shortly. The total project cost for expansion and diversification of production and updating of process technologies is expected to go beyond Rs. 100 crores, of which 20% would be raised from internal generation and the balance from suppliers' credit, institutional loans, debentures and other external sources. The Directors will take the Shareholders into confidence and invite their financial participation at the appropriate time.

Prospects for 1987-88

For the five-month period, April to August 1987, production of SBR was 11,825 MT and sales 11,228 MT, valued at Rs. 30.55 crores, as against production of 7,704 MT and sales of 7,262 MT valued at Rs. 18.69 crores, respectively, during the period April to August 1986. This improvement can be attributed mainly to the shift in the raw material base from alcohol to petro-butadiene and the removal of SBR from OGL placing it on the Restricted Imports List from 26th June, 1986, as observed earlier. The gradual recovery in sales reached full scale level by December 1986. It is, however, a matter of concern for us to find that the sales during the year that has begun have not been keeping pace with our current production of over 3,182 MT per month achieved in August 1987 — a rate of production which our Company would not be wise in maintaining in the long run unless the sales can be kept up at a corresponding level, for which we need the helpful co-operation of our valued customers.

You will be happy to know that the Company has executed in full each and every order booked and has been able to maintain its SBR inventory at a very satisfactory level. In view of this comfortable supply position of indigenously produced SBR, there is every justification for us to enlist the co-operation of our esteemed customers in their not opting for SBR imports. We would also earnestly appeal to the Government to place a total ban on imports of SBR in the interest of supporting indigenous industry in the cause of self-reliance and conserving valuable Foreign Exchange.

DEV CHEMICALS

M/s. Dev Chemicals, manufacturers of strontium carbonate, strontium chloride, strontium nitrate and strontium sulphate are planning to increase their capacity from 30 to 90 tonnes per month. The company, located in a backward area of Tamil Nadu has been supplying the requirements of customers in Tamil Nadu, Karnataka, Bombay and Calcutta. The company also plans to diversify into the production of Barium Nitrate and Potassium Nitrate. Initially the company will be producing 60 tonnes per month.

KANORIA CHEMICALS

Kanoria Chemicals and Industries has fared well during the year ended June 1987. The dividend has been stepped up to 15 per cent from 10 per cent paid last year.

The production of caustic soda, was 23,659 tonnes agains 22,720 tonnes and of pentaerythritol 1669 tonnes against 149 tonnes. Sale of cloth and yar during the year increased fro Rs. 14.27 crores to Rs. 18.2 crores.

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Highlights in Chemical Technology (Part 1)

PET RECYCLING PROCESS UNDER DEVELOPMENT FOR EEC

Polymer Technologies, the plastics reclamation arm of Yorkshire, UK-based Optimum group has received EEC funding worth almost Pound 400,000 ($640,000) to further its research into polyester terephthalate (PET) recycling.

Research work is to be undertaken by Polymer Technologies in conjunction with Bradford University School of Chemical Engineering (UK) and the TNO Plastics & Rubber Research Institute in Delft, Netherlands. A second development grant worth over Pound 23,000 has been also awarded by the UK Department of Trade and Industry, to cover 70% of the cost of developing a new process for compounding recycled PET. (*ECN* 7/20/87 p. 18)

A NEW CATALYST LIBERATES HYDROGEN FROM ETHANOL FIVE TIMES FASTER

Researcher David Cole Hamilton of St. Andrew's University in Scotland has developed a superior catalyst that free hydrogen -- a key ingredient of fertilisers -- from alcohols. The new catalyst liberates hydrogen from ethanol five-times faster than existing catalysts. Nor do the reaction products include carbon monoxide, a gas that poisons (destroys the action of) catalyst as well as people.

Traditionally, fertiliser manufacturers harvest hydrogen from petroleum by putting it in contact with steam. Scientists have sought to produce hydrogen catalytically irom alcohols to guarantee fertilizer supplies, if petroleum runs short. The idea is to exploit alcohol that would otherwise go to waste in industrial effluents, or to generate hydrogen from biological waste.

Most chemists choose to free hydrogen from ethanol through a catalysed reaction called a dehydrogenation.

The idea is to strip a molecule of hydrogen from each molecule of ethanol. This is an uphill struggle because of the mechanics of the reaction and the energies involved as the balance of the reactants and products changes. The net result is that yields of hydrogen are low, as is the rate of its production.

Cole-Hamilton's new catalyst, which includes the rare earth metal rhodium solves this problem. It catalyses all the molecular changes that lead ultimately to the production of hydrogen.

The process becomes a downhill one thermodynamically, so more hydrogen is liberated and at 5-times the rate of orthodox dehydrogenation reactions. (*New Sci.* 7/30/87 p. 33)

A SYSTEM DEVELOPED TO RECOVER PRECIOUS NOBLE METALS FROM AUTO CATALYSTS BY MITSUI & CO., USA

Mitsui & Co. (USA) has started to market a system which recovers precious noble metals from scrapped auto catalytic converters. Mitsui reports the process permits a 95-97% selective recovery of a number of precious metals including platinum, palladium, rhodium, gold and silver. The metals are dissolved in hydrochloric acid and then deposited electrolytically on to carbon particles. After redissolving in acid, the pure metals are selectively precipitated. (*ECN* 7/20/87 p. 18).

A NEW POLYMER-BASED IMPLANTABLE DRUG DELIVERY SYSTEM ON THE HORIZON

An implantable drug-delivery system developed by researchers at the Massachusetts Institute of Technology (MIT) offers users two important advantages: a steady rate of drug release, and a tremendous span in the duration of drug delivery --from 1 day to 10 years.

The system is made up to biodegradable polymers -- poly--anhydrides -- that permit the release of a drug at a constant rate. The polymers dissolve through surface erosion. This contrasts with most of the polymers used for such system today, which dissolve through bulk erosion, and are therefore susceptible to 'dumping' the drug. According to Robert Langer of MIT, surface erosion means that the drug release is totally determined by how fast the polymer dissolves and the rate of release is predictable. Explaining how surface erosion can work to provide steady drug levels, Dr. Langer compared the new system to the pages of a book, each of which holds the same amount of drug, which dissolve one at a time, at the specified rate.

Because the rate of drug delivery is so carefully controlled, the new delivery system, can be used with drugs that are highly toxic to some organs, in order to treat others. For ample, some antineoplastic drugs ed to treat brain tumours are toxic the liver and kidneys. Langer nts out that by controlling the els of drug release and directing o a precise target, toxicity pro- ms can be eliminated.

n one study, the polymer system, ntaining the Bristol Myer's anti- ncer drug CC NU, was implanted mice with leukemia. The searchers found that they can uble the survival time of mice in tumour model, which illustrates at they can release this in active m. The researchers are now rking on optimizing this for brain mour patients.

So far the system itself seems to remarkably free from toxic ects. Because the anhydride stem can keep putting out steady els of drug for such prolonged riod of time, the researchers are so working on ways to make per- dic changes in drug output. One ea currently on the drawing board to make use of the fact that the e of release can be altered by rasound. The patient would wear ultrasound watch that could reg- te how fast the polymer dissolves d thus how fast the drug is eased. (*Am. Pharm.* 2/1987 p.).

W UNVEILS AN INNOVATIVE STEM THAT ANALYZES INE--STREAM COMPOSITION

Dow Chemical researchers have ently unveiled a unique system t analyzes amine stream compo- on. Claimed to be the first method s kind, this measures -- via capil- gas chromatography -- the sence of individual amines and ir isomers in amine mixtures. nough a number of methods exist nalyze amine properties, there is generally accepted system for npositional analysis, report Dow scientists, who have found that capillary columns containing non-polar, cross-linked, fused silica provide precise, reproducible measures of amine composition.

The new system is especially valuable with high-molecular-weight amines, such as triethylene tetramine and tetraethylene pentamine, which are frequently used in lubricating oils, fuel additives and polyamide resins. Information about the method is available free from the Company's chemicals and metals department in Midland, Michigan. (*Chem. Eng.* 7/30/87 p. 12).

ANOTHER ADVANCE TOWARDS ROOM TEMPERATURE SUPERCONDUCTIVITY

Room temperature superconductivity has been repeatedly demonstrated for up to 2 days in several materials by researchers at Colorado State University (CSU) at Fort Callins, Colorado. Moreover, the researchers have isolated the regions of the bulk material that are superconducting at room temperatures. To isolate these regions, Walajabad Sampath, a CSU professor of Mechanical Engineering, cooled small particles of superconducting material with liquid nitrogen and applied a magnetic field. The superconducting particles generated their own magnetic field, thereby repelling the applied field. That caused the particles to rotate against the applied field. Under a microscope, the researchers could see the particles dance. The rotating particles are then separated from those that are not rotating and, therefore, not superconducting. Researchers at CSU have applied for a patent on the superconducting materials -- which are blends of copper, yttrium, barium and other rare earth oxides -- and on the process for isolating the materials. (*Chem. Wk.* 8/19/87 p. 20).

A NEW MAN-MADE CATALYST DEVELOPED TO FIX NITROGEN FROM AIR

Research chemists at the Unit of Nitrogen Fixation at the University of Sussex are working on a novel electrochemical reaction that mimics the way nature scavenges nitrogen from the atmosphere. This is one new breakthrough step that could lead in future to a commercial replacement for the traditional Haber process, which annually supplies about 50 million tonnes of ammonia for fertiliser. Haber process is expensive, requires high temperatures (500°C) and pressure (200 atmospheres) plus hydrogen from fossil fuel.

Certain bacteria that live in soil or in the root nodules of leguminous plants, such as peas and beans, fix nitrogen from the atmosphere under much gentler conditions. Researchers have been looking at the chemistry of this reaction wistfully for perfecting a simpler man-made way of making ammonia. Nitrogen gas, or more correctly dinitrogen ($N = N$ or N_2), has a very strong triple bond that links the nitrogen atoms. It requires a rather special catalyst to break the bond and to add on three hydrogen atoms to each nitrogen atom to make ammonia. The bacteria use an enzyme nitrogenase, which contains the element molybdenum. Instead of consuming hydrogen gas, the enzyme relies on a supply of hydrogen ions and electrons. Researchers have yet to work out the complex structure of nitrogenase (*New Scientist* 10th April 1986, p. 30), but a simpler chemical model shows that the molebdenum atom plays a key role. It helps to stage what amounts to a 'tug of war' on a molecular scale.

The nitrogen molecules itself attaches itself to the molybdenum atom, which weakens the triple bond

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by drawing electrons away from it. At the same time, a series of biochemical reactions supplies electrons to the complex. This gives the nitrogen atom farthest from the molybdenum atom a negative charge. Positive hydrogen ions add on in sequence until the bond between the nitrogen atoms break. Hydrogen ions then start to add on to the second nitrogen atom to produce a second molecule of ammonia.

What the Sussex researchers have done is to take a much simpler molecule containing molybdenum or tungsten, that binds nitrogen in a similar way to nitrogenase. A mercury cathode supplies the electrons. The hydrogen ions come from a solution of tosylic acid which surrounds the electrode. The tosylate anion adds on to the molybdenum atom but comes off at a later stage, while the hydrogen ions attack the nitrogen atoms in a similar way to that in the biological analogue, but at a much faster rate.

So far, the researchers have managed to put their catalyst through the reaction cycle only a few times. They report, however, that the reaction looks very promising. (*New Sci.* 9/3/87 p. 27; 4/10/86 p. 30).

ICI BUILDING A BIG ZIRCONIA PLANT IN WESTERN AUSTRALIA

ICI (Australia) has finalised plans to build a A$13 million Zirconia plant at Rockingham, Western Australia to cater to international advanced ceramic markets for electronic and engineering applications. The plant will produce 450 tonnes/year of high purity powders and 250 tonnes/year of Zirconium compounds.

The plant will be based on novel processing technology. ICI reports the products will be able to be tailored to individual requirements i.e. specific purity, particle size distribution and surface area. (*Mfg. Chemist* 1/1987 p. 8).

A LOW COST SYNTHETIC ZEOLITE EXTRACTION FROM PUMICE STONE DEVELOPED IN ITALY

Researchers at Messina University, Sicily have unveiled a method of extracting Zeolite from pumice stone to provide not only a low-cost non-toxic substitute for phosphorus in detergents, but also a highly effective additive for chemical fertilizers.

Various companies have collaborated on an international scale to produce zeolite to tackle the problem of pollution caused by phosphorins in detergents discharged into rivers and other waterways but the main stumbling block has been the high cost of the processes used.

The Messina team maintains that their method not only costs less but produces a by-product which when mixed with chemical fertilizers helps to stretch their effect. This has been attributed to the porosity of the material which enables the soil to retain the active ingredients for much longer periods.

A new company Italzeoliti SpA has been formed to operate and market the new extraction methods and it is building a factory at Milazzo near Messina. (*Mfg. Chemist* 1/1987 p. 11)

ALKYL POLYGLYCOSIDES --- A NEW SERIES OF MOLECULES FOR THE SURFACTANT MARKET

Workhorse surfactants like linear alkyl benzene sulfonates (LAS) and linear alcohol ethoxylate (LAE) may have a new stablemate, if product claims for alkyl polyglycosides (APGs) are realized. Horizon Chemicals (Decatur, Ill. USA), a recently formed division of Corn Wet Miller A.E. Staley Manufacturing Co., has recently developed nearly water white (or pale-yellow) products. These products are described by the company's researchers 'as the first really new molecules for the general surfactant market in 20 years'.

These non-ionic condensation products of starch and fatty alcohols (called alkyl polyglycosides or APGs) equate to LAE and LAS in tests of surface tension, Draves wetting times and critical micelle concentration. Furthermore they are said to achieve greater and faster reductions in interfacial tension between oil and water. A 'remarkable aqueous solubility' in the presence of high concentrations of inorganic builders, according to reports from the company's researchers. This property permits formulation of concentrated power and liquid detergents with little or no hydrotrope for stability. Horizon Company is readying a 5-7 million lbs/year plant at Houston to produce the new surfactants. (*Chem. Wk.* 1/21/87 p. 55).

GUAYULE -- A POSSIBLE NEW SOURCE OF MANY CHEMICAL PRODUCTS

Researchers on Guayule plant at the University of Southern Missisipi has upgraded the value of guayule -- a rubber plant native to the South Western USA. Although, it depends on growing condition, 10-20% of guayule yield is rubber. This rubber plant has been shown to be the potential source of many other chemical products.

A water soluble resin that totals 10% of the yield can be extracted from the guayule plant reports Shelby F Thames, a researcher at the above University. The resin's chemical structure is yet to be identified. This water-soluble resin has otential use as a pigment carrier paints.

Researchers have also extracted lycerides from guayule. What's ore, the 48% of the shrub uayule) that ends up as bagasse uld be used for making low grade per or could be converted into tivitated carbon, for water treat- ent. (*Chem. Wk.* 9/9/87 p. 10).

PAN UNVEILS A SUPER- ONDUCTING METALLIC ERAMIC MATERIAL AMENABLE) LIQUID NITROGEN

Japan's National Research Insti- e for Metals (NRIM), Tokyo, is king its presence registered in the rldwide race to find materials that superconducting at relatively h temperatures amenable to uid nitrogen cooling.

NRIM has developed a 'metallic ramic mixture' composed of barium, yttrium, copper and oxygen that starts to become superconductive at about 120°K (-150°C) maintaining that the temperature is one of the highest yet at which superconductivity has been achieved. The same material's electric resistance becomes completely zero at 93°K (-180°C). The conventional superconductor need to be cooled by the exhorbitantly expensive liquid helium. The new Japanese material reports NRIM can reach the superconducting state upon cooling with liquid nitrogen.

The major shortcoming of superconducting materials developed thus far is that they can carry only a small amount of current that eliminates their use in all but a few electronic applications. The challenge before researchers in this field, therefore is to develop super-conducting materials that can hold large current densities. (*Chem. Wk.* 3/18/87 p. 25) (*Chem. Wk.* 9/9/87 p. 8).

ANHYDROUS ACETONE NITRILE

For the DNA synthesis and similar processes acetone nitrile is required that should be as free from water as possible. A producer of ultra pure solvents and an analytical company have now introduced a special anhydrous acetone nitrile in two versions, which differ only in their UV transmission: Product 3127210 has a 50% UV transmission at 230 nm and Product 3127010 50% UV transmission at 195 nm. In both cases the water contents is below 50 ppm.

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Chlorine Utilisation

V.K.M. MENON
Executive Director, Alkali Manufacturers' Association of India, Bombay

STORY OF CHLORINE

The man who first produced pure Chlorine (though ccidentally was a Swede named Carl Wilhelm Scheele. e was not investigating gases at all; but a mineral alled brownstone or magnesia. In one of his experients in 1774, Scheele ground the brown-black mananese dioxide and poured cold hydrochloric acid over When he warmed this mixture, it began to effervece, the gas collected in glass bottles showing an ellow-green colour. He also discovered its bleaching ction, for when he placed multi-coloured flowers and een leaves in these bottles, all became white in a few inutes. Since most chemists in those days believed 'phlogiston' theory of matter, there was a controversy ver whether the gas discovered by Scheele was a ompound or an element. It was Humphry Davy, in 810, who proved that this product was an element, and ave it the name "CHLORINE" from the Greek word HLOROS', meaning yellow-green.

Commercial use of Chlorine started in 1789, when its eaching property was first tried out on textiles. The first ritish patent on a bleaching compound was issued in 798 to Charles Tennant for a solution made from Chlore and Lime water.

Michael Faraday was the person who came up with method for liquefaction of Chlorine in 1823. Chlorine roduction through electrolysis started at the very beginnng of the Nineteenth Century with Faraday decomosing the molten salt into Chlorine and metallic sodium. oon thereafter, in January, 1834 he reported that on sing a solution of sodium chloride in water, there was volution of Chlorine at the positive electrode and of ydrogen, with the oxide of the base, at the negative lectrode. An electrolytic cell for Chlorine production with diaphragm placed between the two electrodes was eveloped and patented by an English chemist, Charles Vatt in 1851. The world's first commercial unit for aking Chlorine and Caustic soda began operation in 893 at Rumford, Maine in U.S.A., using the cell quipped with an asbestos diaphgram. The use of a ercury cathode was brought to a commercial stage by nother English chemist named Hamilton Young Caster, and the first mercury cell plant went into operation in Great Britain in 1897 based on the work of the Viennese engineer named Carl Kellner. The concept of a long slightly inclined trough in which mercury and brine flow slowly through the force of gravity, with the anodes positioned above in the brine was invented by Kellner. It is this basic design -- though progressively improved --that is used in most of the mercury cell installations even today.

USES OF CHLORINE

Chlorine, probably, has more diverse uses than any other known chemical. Following the British patent on a bleaching compound taken out by Charles Tennant in 1798, the Pulp and Paper Industry also started using Chlorine for bleaching purposes. Sanitation was the next important use to develop, with its use for destroying bacteria in drinking water following. With the advent of synthetic organic chemical industry, production of chlorinated organic compounds led to a phenomenal growth in use of Chlorine for the manufacture of substitutes for natural products, as well as of entirely new and useful compounds. Today, chlorine finds a place in each and every sphere of human activity, whether it be food, clothing, shelter, health, transportation, communications, recreations or defence. Some of the major chlorinated organic compounds and their important uses are listed in the table on next page.

A more detailed list of Chlorine based derivatives with a rough indication of their spheres of use will be given in the forthcoming issue.

Until a few years ago, usage of Chlorine in India was restricted to the conventional spheres of bleaching sanitation, water purification, etc. However, with the advent of the organic chemicals industry, in our country too, indigenous production of newer chlorinated compounds has led to increased consumption of Chlorine. India, with its large population, has a vast marketing potential for diverse items possible to be manufactured with Chlorine base, and the day is not far off when here also the industry would come to be known as the Chlorine industry as against the caustic soda industry as at present.

PAST PROGRESS IN INDIA

Commercial production of Caustic soda and Chlorine first started in India in 1941 with the commissioning of

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ote: The views expressed are purely personal and do not reflect ose of the Alkali Manufacturers' Association of India.

TABLE

1.	Benzene Hexachloride	--	Insecticides
2.	Carbon Tetrachloride	--	Manufacture of Fluorocarbons for refrigerants and propellants
3.	Chloral	--	Insecticides manufacture
4.	Chloroform	--	Manufacture of fluorocarbons and drugs
5.	Chloro Paraffins	--	Lubricant additives and paints
6.	Dichlorobenzene	--	Insecticides and organic solvents
7.	Ethylene dichloride	--	Tetraethyl lead antiknock compounds and vinyl chloride
8.	Ethyl chloride	--	Tetraethyl lead antiknock compounds
9.	Ethylene oxide glycol	--	Antifreeze fluids and synthetic fibres
10.	Glycerine, synthetic	--	Resins, tobacco manufacture and explosives
11.	Methyl chloride	--	Silicones manufacture; solvent and catalyst carrier
12.	Methylene chloride	--	Paint remover, propellants and solvent
13.	Monochloro acetic acid	--	Herbicides, detergents, pharmaceuticals and permanent wave preparations
14.	Monochlorobenzene	--	Phenol, aniline and DDT insecticides
15.	Perchloroethylene	--	Dry cleaning
16.	Propylene glycol	--	Polyester resins, cellophane
17.	Trichloroethylene	--	Metal degreasing
18.	Vinyl chloride	--	Plastic and resin products

two 5 TPD plants in Calcutta and Mettur Dam. As at present, we have a total annual installed capacity of 11.2 lakh tonnes of Caustic soda and corresponding 10 0 lakh tonnes of Chlorine. With the development of Chlorine consuming sectors falling far below that of Caustic soda consumers, under utilisation of Chlorine and a very low level of monetary realisation from even the portion gainfully utilised, have been major problems that the Chlor-Caustic industry in India has had to face right from its inception. Whereas till the late Sixties gainful utilisation of Chlorine produced was only in the region of 60 to 65 per cent, there has been a welcome upward trend since then with the percentage of utilisation reaching a record level of 94 per cent in 1986. Table-A gives the quantitywise details of the utilisation pattern during the past 12 years.

Unfortunately, this encouraging trend is not reflected in the level of monetary realisation from the quantities gainfully utilised. Whereas in the advanced countries both Caustic soda and Chlorine occupy prime positions as major industrial raw materials, in our country Chlorine has till very recently, been considered a "poor distant cousin" to Caustic soda. As a matter of fact, the units had to incur additional expenditure for destroying the Chlorine which cannot be usilised. Resultingly, Chlorine prices in India (whether as Chlorine itself or as Hydrochloric Acid) continue to be the lowest in the world. The low realisation from a co-product, which is evolved in practically equal measure, has been one of the major factors for the seemingly higher levels of prices for Caustic soda, when compared to those prevailing in advanced countries. If a comparison were to be made of the total realisation to the producer per tonne of Caustic soda and chlorine, it will be amply evident that the price structure of the Chlor-Caustic industry in India, despite the steeply mounting power cost, is really creditable. Graph-1 indicates the trends in (1) Ex-Factory prices of Caustic soda, (2) Average Power costs and (3) Realisation from Chlorine gainfully utilised per tonne of Caustic soda during the past 12 years.

Looking at it from another angle, this could also be interpreted to mean that an unrealistically low price of chlorine poses a burden on Caustic soda consumers. It is only fair and reasonable to hope that with larger avenues opening up for newer applications of Chlorine, this product would be able to sustain a better price commensurate with its importance.

PRESENT POSITION

As is well-known, 0.889 tonnes of Chlorine is evolved per tonne of Caustic soda production. Being a poisonous gas, it has either to be gainfully utilised or destroyed through appropriate measures so as to prevent environmental pollution. The gas evolved at the cells, after drying and compression, is liquefied to the extent to hich demand exists for Chlorine as such. The balance uantity is converted into Hydrochloric acid by combing with Hydrogen, which is also obtained as a co-roduct in Chlor-Caustic soda production. Thus, chlorne is gainfully utilised either as Chlorine itself, or in the hape of Hydrochloric Acid. A perusal of Table-A will ndicate that by and large two-third of the Chlorine utised is as Chlorine itself, the balance one-third being s Hydrochloric acid. Currently, around 30 per cent of tilisation is in the producers' own units for manufacture l items such as Paper, P.V.C., Insecticides, Bleaching owder, Chlorinated Solvents, etc. Balance 70 per cent sold to outside parties either as Liquid Chlorine or ydrochloric acid. With the number of consumers runing into thousands, and engaged in multifarious activies, it has not been possible to categorise with xactitude the levels of Chlorine consumption by each ector. However, some indication of the trends in secorwise consumption of chlorine and Hydrochloric acid, ased on a study made by the Alkali Manufacturers' ssociation of India in 1985 is given in Table-B. It is to e reiterated that the figures should not be taken as bsolute, but only indicative of the trends based on genral assessment of the various consuming sectors. It will lso be observed that a substantial quantity has been lassified under the heading 'Miscellaneous'.

The price levels of both Chlorine and Hydrochloric cid evidence wide variations, depending upon location f the unit and the extent of development of consuming ectors in nearby areas. The physical and chemical roperties of both the products not being conducive to ng haulages, a buyers' market prevails for both the ems. The problem becomes further compounded when ny major consumer temporarily stops or reduces offake due to various reasons, such as maintenance shut own, labour problems, etc. Instances often arise when roducing units are forced to market Hydrochloric acid ven at 'Negative' prices in order to keep the plant in peration. As mentioned earlier, together with under utilsation, unrealistically low realisation from Chlorine/Hyrochloric acid has been a cross the Chlor-Caustic soda ndustry in India has had to carry right from its inception.

OOKING AHEAD

The very versatality of the chemical concerned makes difficult to foresee with any degree of accuracy the line f demand growth for the product. This is particularly o, as in the past, utilisation has been mostly confined conventional consuming sectors, such as, Paper, Texle, Insecticides, Sanitation, Water purification etc. Offake from the organic chemicals sector has been only recent development, and it is in this area that demand growth is going to branch out. In the U.S.A., nearly 70 per cent of the total Chlorine produced is consumed in the manufacture of organic compounds. Chlorinated organic solvents alone accounting for over 30 per cent. The list of major uses given in the Annexure and the variety of applications of products so manufactured will clearly indicate the potential that is waiting to be tapped. In other words, future demand for Chlorine is not one which 'arises' but which is to be 'created'.

Thus, while it might be difficult to estimate the extent of demand growth for Chlorine, it is possible to have an idea on the extent of availability of the chemical, based on the fact that it is a coproduct in the manufacture of Caustic soda. Keeping in view the overall assessment of the main consuming sectors, the demand for Caustic soda which is currently of the level of 8.0 lakh tonnes per annum, may grow at the rate of 40,000 tonnes annually, reaching the 1 million tonnes mark by 1992-93. Corresponding availability of Chlorine at that time can therefore be estimated at around 9.0 lakh tonnes. Having regard to the substantial increase visualised in the organic chemicals sector in these coming years, a bright future is what can be foreseen for Chlorine based industries.

On the other hand, there is another aspect of the issue, which is most vital, namely the financial angle. In these days of high initial capital requirement, and steeply rising cost of vital raw material, Electricity, the future of Chlor-Caustic soda industry is bleack indeed, unless the realisation from co-product Chlorine is also commensurate with its cost of production. While the older units in the industry with low capital base and depreciation liability have been able to somehow tide over the critical period the industry has been passing through recently, the plight of the few units which have come into existence during the past four years has been really dismal, as is well-knwon from Balance Sheets. The prognosis for a future grass root plant appears still worse as is illustrated in the estimates of fair selling price in a new 100 TPD Chlor-Caustic soda plant, detailed in Table-C. While the exact figures might vary depending upon locational and other factors, there is no gainsaying the fact that for a grass root Chlor-Caustic plant to be economically viable the level of sales realisation from one tonne of Caustic soda and corresponding 0.89 tonnes of Chlorine has to be very much more than what it is today.

The Caustic soda price levels already nearing saturation point, the only course open is to strive for a reasonable realisation from Chlorine/HCl. Even in the case of the existing units, in this era of rocketing power costs, the only hope for survival is to get a better realisation from Chlorine/HCl. In other case, there is an imperative need to venture deeply into the field of chlorinated products, which can sustain a much higher price level for Chlorine than as now. The emphasis has to be shifted from "GAINFUL UTILISATION OF CHLORINE" to "GIVING CHLORINE ITS DUE IMPORTANCE". This is easily said than done. This might entail going into production of sophisticated chlorinated products either directly or fostering ancillary units. Since many of the applications for such products might be novel to the public at large, there might even be need for extending assistance in the field of marketing. With the comparatively lower Chlorine prices, it should also be possible to explore export avenues for sophisticated chlorinated compounds.

The road ahead is bright, but rough.

TABLE-A

PATTERN OF CHLORINE UTILISATION

Year	Total Production of Chlorine MT	Utilised as Chlorine MT	Chlorine utilised as HCl MT	Total Gainfully Utilised MT	Percentage Utilisation (%)
1975	3,69,000	2,18,800	0,97,600	3,16,400	85.7
1976	4,16,200	2,32,300	1,11,200	3,43,500	82.5
1977	4,34,100	2,67,600	1,14,700	3,82,300	88.1
1978	4,70,000	2,83,100	1,39,600	4,22,700	89.9
1979	4,88,500	2,76,300	1,52,900	4,29,200	87.9
1980	4,82,300	2,75,900	1,57,100	4,33,000	89.8
1981	5,35,400	3,01,400	1,74,600	4,76,000	88.9
1982	5,19,300	2,96,600	1,71,500	4,68,100	90.1
1983	5,31,700	3,07,600	1,67,100	4,74,700	89.3
1984	6,30,000	3,63,900	1,89,000	5,52,900	87.8
1985	6,35,300	3,80,200	2,01,200	5,81,400	91.5
1986	6,36,000	3,92,100	2,02,900	5,95,000	93.6

Note:

1. The figures should not be taken as absolute, but only indicative of the trends. 2. 3 tonnes of HCl taken as equivalent to 1 tonne of Chlorine.

TABLE-B

ESTIMATED PATTERN OF CHLORINE CONSUMPTION IN 1985

End-use Industry	Qty. of Cl_2 consumed in hundred tons
As Chlorine	
Paper & Boards	1,350
Newsprint	300
Rayon Grade wood pulp	200
Polyvinyl Chloride	600
Water Treatment	400
Bleaching Powder	200
Insecticides (BHC & DDT)	300
Textiles	100
Others and Miscellaneous	350
Total	**3,800**
As Hydrochloric Acid (In terms of Cl_2)	
Demineralisation	700
Ossein	300
Metal pickling	120
Dyestuffs	80
Other and Miscellaneous	810
Total	**2,010**
Grand Total - Chlorine Consumed	**5,81,000**

Notes:

1. The figures are only estimates and should be taken only as indicative of the trend.
2. 3 tonnes of HCl taken as equivalent to 1 tonne of Chlorine

TABLE-C

ESTIMATES OF FAIR SELLING PRICE STRUCTURE IN A GRASS ROOT CHLOR-CAUSTIC PLANT

Broad Assumptions

(a) Initial Capital investment for a new 100 TPD Chlor-Caustic Plant, employing the Membrane technology is estimated at Rs 33 crores. Split up as follows:

	Rs. in Crore
Land and Buildings	3
Plant & machinery (inclusive of import duty wherever applicable), including electrical installations, general services, chlorine containers, laboratory and workshop, but excluding fusion plant	27
Working Capital	3
Total	**33**
i.e. Rs. 10,000 per tonne-year capacity.	

(b) Cost of Capital Servicing may vary depending upon the mod of financing, rates being different for Institutional loans, publi borrowings, etc. Shareholders will have to be paid a fair dividen on subscribed equity capital. An overall rate of 22% is, th minimum, inclusive of tax, wherever applicable.

(c) Depreciation has been assumed at 10% on straight line basi for a period of10 years on plant and machinery. On land an buildings, it is taken as 2.1/2 per cent.

tem of Cost	Incidence per tonne of production Rs.
A. Variable Costs	
Salt (1.5 tonnes @ Rs. 300 per MT)	450.00
Power (2,500 KwH @ Re.1 per KwH)	2,500.00
Anode & Cathode Coating (Proportionate)	50.00
Membrane Replacement (Proportionate)	250.00
Steam for Concentration to 50% lye stage	150.00
Brine purification chemicals	200.00
Sub-Total 'A'	3,600.00
B. Standing Charges	
Direct Labour	200.00
Repairs & Maintenance Stores & Spares	350.00
Other Manufacturing Expenses	150.00
Factory & Administrative Overheads	400.00
Miscallaneous expenses	100.00
Sub-Total 'B'	1,200.00
C. Fixed Costs	
Depreciation	840.00
Servicing of Capital	2,200.00
Sub-Total 'C'	3,040.00
Total Cost of production, assuming 100% Capacity Utilisation (A+B+C)	7,840.00
At normal 80% capacity utilisation, ncidence of Standing charges and fixed ost will be correspondingly higher Rs.1,500 and Rs. 3,800 respectively). Total cost of production at 80% operation level	8,900.00

Productions Obtained:

Caustic Soda -- 1.00 tonne;
Chlorine/HCl -- 0.89 tonne.

Notes:

Individual cost factors may vary depending upon locations, and should be taken as only indicative.

Rates mentioned are by and large based on industry-wise averages, projected 2 years hence.

The power consumption level of 2,500 KwH is as A.C., inclusive of auxiliaries.

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(To be continued)

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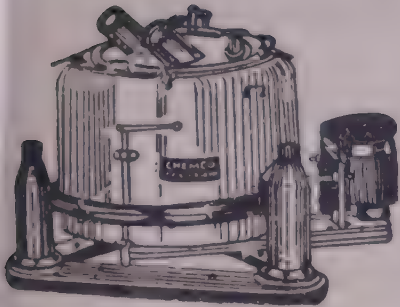

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Chemical News from Abroad

ATOIL MULLS NEW HYLENE CRACKER AT EBRUGGE

Norway's Statoil is believed to planning an ethane-based hylene cracker at Zeebrugge, lgium, at the end of the Zee- pe transport system that will ing North Sea gas ashore.

The first phase of the gas peline is due onstream in 93, carrying gas from the eipner field. This will be top- d up in 1996 with gas from e Troll field, which is owned 4 per cent by Statoil but ope- ted by Shell. The latter com- any, it is understood, will not ke a stake in the new cracker.

Statoil's plans for 1988 will e presented to the Norwegian overnment in late autumn and ill include proposals for a pet- chemical development in Bel- um. This will be in addition proposals for a polypropylene/ ropane venture at Antwerp with aly's Himont.

Serious overspending to the ne of $555m, or 56% in con- ection with Statoil's Mongstad efinery project has already ade the Norwegian government ery cautious about Statoil's ending plans however. Chan- es of winning approval for the P joint venture by the Christ- as target date are rated as im.

Investment in a cracker at eebrugge would be expensive. is estimated that some 1.3m on of ethane in total will be vailable from the dry gas brou- nt onshore at the Belgian port. his includes some 80,000 ton om Sleipner and 500,000 ton om the much larger but less hane-rich Troll field.

Sufficient ethane would be vailable for the production of 1m ton/year of ethylene. But observers have noted that the cost of fractionating the dry gas, which will comprise a mixture of methane and ethane, could be "astronomical" and expensive cryogenic facilities would be needed for liquefaction purposes.

A spokesman said that the project was "unknown to Statoil" but sources close to the Norwegian government have confirmed that plants are afoot.

Nordic rival Neste of Finland aroused concern in European petrochemical circles recently, with the announcement of plans to build a new cracker at Antwerp, jointly with Petrofina. A second new cracker in Belgium is seen by one top executive as no less than a shot in the foot to the industsy, which has only recently achieved equilibrium in ethylene supply and demand.

Capacity is already estimated by BP to be expanding by 400,000 ton/year. Union Carbide boss, Bob Kennedy, said at a recent SCI meeting in Geneva that the polyethylene price is around reinvestment levels for the first time in six years but ethylene is not. In the US, PE grew last year by 11-12 per cent, he said, but basic growth is only 6 per cent.

Statoil has for some time been considered the primary candidate for ethylene capacity construction and it was thought the Norwegian firm might invest in new capacity at Dunkirk with France's CdF Chimie.

It would also like to debottleneck its Rafnes cracker, which currently produces 370,000 ton/year ethylene, sources say. Statoil is very long on propane and may want to ship this feedstock into Belgium to put through a cracker. The company bought the Stenungsund cracker in Sweden as an outlet for its LPG's.

EXXON CHEMICAL BUYS NL UNIT

In a deal worth between $40-50m, Exxon Chemical Co. is to acquire NL Industries' oilfield chemicals unit, NL Treating Chemicals. Exxon says the move will create one of the major suppliers in this international sector and boost sales of its own Energy Chemicals operations by around 40 per cent.

According to Richard F. Humphreys, vice-president of Energy Chemicals, the deal will combine Exxon's manufacturing and technological strength with NLTC's applications and sales expertise. He also said that the two units are geographically complimentary as much of NLTC's operations are in countries where Energy Chemicals has limited penetration.

An Exxon spokesman said that the merged units will rank in the top five worldwide suppliers of these products which have a total market value of some $600m. Both Exxon and NL have been operating in this sector for over 20 years, and the Energy Chemicals and NLTC units have similar products including anti-corrosion and anti-fouling chemicals. Estimates suggest that NLTC sales were $50m last year.

Both Energy Chemicals and NLTC are headquartered in Houston. NLTC's main plant is at Channelview, Texas and it operates blending plants at Odessa, Texas, Calgary, Canada, and Aberdeen, UK. Energy Chemicals' main operations are also in the US, but the unit operates in the Middle East, North Sea and has been developing business in the USSR. Both units reckon that over 50 per cent of their sales are outside the US.

ARCO COMPLETES EUROPEAN DEALS

Arco Chemical's European arm has completed the acquisition of the Atochem polyols facility at Tieme, Belgium. The deal gives Arco an additional 70,000 ton/year of polyols capacity but this will probably be increased when Arco undertakes planned investments for modernization and debottlenecking.

Arco, a division of Atlantic Richfield, says the acquisition further strengthens its position in polyols in Western Europe. The product is used in the manufacture of polyurethane foams.

Arco's new $333m propylene oxide (the feedstock for polyols production) plant to supply the south European market is currently under construction at Fos-sur-Mer in France. Completion of the $300m unit is due in 1988.

Meanwhile, Arco's chief executive Hal Sorgenti was in Italy to finalize a joint venture deal between the US firm and Enichem Elastomeri whereby the two companies will make and market Arco's **Dylark** styrene-maleic anhydride copolymers in Europe and the Italian concern's thermoplastic styrene elastomers in the US.

Separately, Arco has completed a public offering of 17m shares of common stock at $32/share. Proceeds from the sale will be used for general corporate purposes, the company said.

KIO BOOSTS STAKE IN SPAIN'S ERT

The battle for control of Spain's Explosivos Rio Tinto has intensified following the announcement that the Kuwait investment office's Torras Hostench subsidiary has raised its stake in the chemicals and mining group to 24.9 per cent. KIO has already stated that it would like to sell parts of ERT and restructure the company's chemical operations.

But ERT's chairman, Jose Maria Escondrillas, is fighting the KIO and has won the support of the bulk of the group's creditor banks and the trade unions. He has challenged the KIO to produce an industrial plan for ERT.

According to the KIO, it would like to sell ERT's explosives business and the group's oil refinery at Huelva. Escondrillas, however, opposes this plan and has asked the KIO to present formal plans to the ERT board and shareholders. The Kuwaiti agency may now decide to call an extraordinary meeting of ERT's shareholders in an attempt to force the issue.

Meanwhile, sources in West Germany suggest that the Kuwaitis may have reduced their 25 per cent shareholding in the chemicals giant Hoechst in an effort to raise cash.

PEQUIVEN IN EO VENTURE WITH OLIN, TO BUILD CRACKER

Venezuela's state-owned petrochemicals group, Pequiven has signed a joint venture agreement with Corimon and Olin Corp of the US for the production of ethylene oxide and other ethylene-based products for the local market.

Meanwhile, the Venezuelan group, a subsidiary of Petroleos de Venezuela, is also said to be negotiating another joint venture deal for the construction of an ethylene cracker and West Germany's Veba is understood to be a leading candidate to join the project.

Under the agreement with Olin and Corimon, Pequiven will take a 49 per cent stake in a new company, Practa, which will build a Bolivar500m ($20-25m) plant at Santa Rita in the Zulia province.

The facility will have capacity for 30,000-ton/year ethylene oxide equivalent, of which 20,000 ton/year will be used to produce ethylene glycol for textiles. 8,000 ton/year will be used for ethylene oxide supplies and oil field additives.

The new plant will use Scientific Design technology but no contractor has been appointed. Detailed engineering studies will begin next summer and the plant is scheduled for start up by the third quarter of 1990. These are currently products that Venezuela imports and will be used to produce detergents, cosmetics, disinfectants and varnishes.

Olin will take a 23.5 per cent stake and Corimon will hold 24.5 per cent. The remaining 3 per cent will be held by a number of other investors.

Although neither Veba nor Pequiven will comment, the two companies are also said to be negotiating a joint venture to build a major ethylene cracker in Venezuela as part of the country's strategy to become self-sufficient in chemicals.

Sources say that Fluor Corp is acting as consultant for the project and that some Japanese companies may also be involved.

Venezuela currently needs around 200,000 ton/year ethylene and the project is expected to be around this scale. The likely site is the El Tablazo complex on Lake Maracaibo. The project is expected to cost around $200m.

If Veba joins the project, the
ale of the plant may increase
enable the West German com-
ny to supplement its own
nylene output with product
om the Venezuelan plant.
hane and propane feedstocks
r the plant are expected to
me from Petroleos de Vene-
ela.

P BOOSTS SPECIALITIES

France's Rhone- Poulenc is
quiring the membrane separa-
on division of Societe de Fabri-
tion d'Elements Catalytiques, a
bsidiary of Commissariat a
Energie Atomique Industrie.

The division is a leading spe-
alist in a new generation of
ramic membranes which are
ghly resistant to chemical and
ysical erosion. Its annual sal-
are around FF50m ($8m) of
ich 40 per cent are exports.

Rhone-Poulenc is already in
e organic membrane separation
siness and the acquisition will
uble the group's turnover in
s sector to around FF16-20m.
e French company claims
me 10 per cent of the world
rket which it says is growing
15 per cent a year.

The French group believes its
volvement in both organic and
nerals membranes will give a
ost to its ambitions in the Eu-
pean, US and Japanese mar-
ts.

Separately, the French chemi-
industries trade union, Fede-
ion Nationale des Industries
imiques-CGT, is conducting a
tionwide petition to oppose
privatization of Rhone-Poul-
c. In the past four weeks
r 11,000 signatures have
en collected.

BURMAH BUYS U.S. INKS FIRM

Burmah speciality chemicals of the UK has finally broken into the US speciality inks business with the $4.5m acquisition of Kansas-based Midwest Coatings. Two years ago, Burmah agreed to buy Chicago-based inkmaker Advance Process Supply Inc., but the deal subsequently collapsed.

Midwest is a US market leader in the production of ultra-violet curable inks, which is one of the faster growing sectors in the US inks business, according to Burmah. John Ellicock, ceo of Burmah Speciality Chemicals, said Midwest offers significant synergies with the UK group's own Sericol inks division. These include technology transfers, marketing expertise and key raw materials.

The UK group has made a major push into the US with five acquisitions in the past 12 months. In 1986, turnover for chemicals reached £149m with profits of £11.7m.

PPG AGREES CHINA SILICAS DEAL

PPG Industries is reinforcing its position in the Chinese silica sector. The Pittsburgh-based chemicals group has agreed to create a new joint venture with the Nanchang Chemical Industrial Material Factory to market and develop new applications for silicas.

This deal follows an agreement signed last year in which PPG is supplying both technology and equipment for a world-scale precipitated silicas plant.

Both the 10,000 ton/year plant and the new joint venture, PPG-Nanchang Chemical Technology Development Corp, will be based in Nanchang which is 800 miles south of Beijing in Jiangxi province. Both should be fully operational by 1988.

TRELLEBORG BIDS FOR BOLIDEN

Trelleborg has made a Skr2.7-bn bid for complete control of the chemicals, mining and metals group, Boliden. The Swedish industrial conglomerate already owns 66 per cent, but says that complete ownership would enable Boliden to embark on a new round of acquisitions.

Boliden has been restructuring since Trelleborg took a 41 per cent stake in 1986. The group posted losses of Skr919m on sales of Skr12.4bn last year and spent Skr802m restructuring its businesses. Boliden Kemi, which lost 150 employees, made attempts to cut costs but returned a deficit of Skr44m on sales of Skr2.2bn.

FLUOR AWARDED GERMAN CONTRACT

Du Pont De Nemours Deutschland has awarded Fluor Daniel a contract for the detailed design and construction of a new polyvinyl butyral production facility at Hamm, Uentrop, West Germany. Fluor Daniel in the Netherlands is also responsible for the same services on the new Zytel nylon plant located within existing facilities on the same site.

Completion of the polyvinyl butyral plant is scheduled for mid 1989. PVB sheets, marketed under the Du Pont trade mark Butacite, are used as a laminate in the production of automobile safety glass.

The new facility in Germany is proceeding concurrent with a similar Du Pont project in the US being designed by Fluor Daniel in Greenville, South Carolina.

Chemical Markets Abroad

CRITICAL ACRYLO BALANCE SENDS Q4 PRICES SOARING

After a lean start to 1987, Europe's acrylonitrile producers are now enjoying record margins in what has been described as the "tightest market ever." From a low of DM1,200-1,250/ton at the beginning of the year, acrylo prices have surged to DM1,800-1,830/ton for Q4 contracts with some settlements being heard as high as DM1 875/ton. Most products are already fully sold.

However, there is continuing discontent amongst buyers who believe that prices have now gone too far and should be cut to a more realistic level. They claim the market could suffer another collapse if demand in downstream businesses begins to slacken.

Recent price hikes have been blamed on a worsening supply/demand ratio with a number of acrylo producers experiencing production difficulties. An unscheduled shutdown at Sohio's Green Lakes plant in Texas in September slashed US exports and put increasing pressure on European producers. T2 output has been forced up by 15,000 ton this year, sources say.

But Europe too has had its share of problems. Problems at BASF's Seal Sands facility combined with other maintenance shutdowns have served to tighten European supply further. The situation is unlikely to change for the rest of 1987 with six out of eight European producers scheduled for maintenance shutdowns in Q4.

Stocks in Europe are now running at a record low with one producer "counting out the last tons" and another "right down to the bottom of the tanks." A number of consumers had supply problems and couldn't obtain enough Q3 material forcing very early Q4 settlements. Sources say consumer stocks are around 20 per cent lower than at this time last year.

US export supply has all but dried up in the wake of production problems and T1 spot material is almost non-existent in Europe. T1 product is now at well over $930-950/ton cif Gulf Coast against $450/ton at the beginning of 1987 and material is changing hands in some cases above $1,000/ton, taking it well over T2 prices. As a result, most US product is now being diverted to other export markets, particularly the Far East where demand from the acrylic fibres industry is holding up well

Little product is emerging from the Eastern Bloc and some countries are now in deficit. The supply picture looks unlikely to be resolved in the long term, with no new capacity due on stream and some European producers even considering cutbacks in capacity. Observers suggest that producers will be concentrating on debottlenecking and catalyst changing shutdowns which could add some 20-30,000 ton to total capacity.

Demand from acrylic fibre producers is continuing to be strong, with consumption growing some way ahead of levels predicted earlier this year. Most fibre plants are running at or near capacity with some "catching up" after production difficulties experienced in Q3. Demand from other consumers, including ABS, adiponitrile and acrylamide producers is particularly buoyant with sources suggesting demand up 7-8 per cent on last year.

But consumers are increasingly unhappy with spiralling acrylo prices this year and there have been warnings that the market could be set for a slump next year if downstream demand, particularly in acrylic fibres falls off. There is already evidence that demand is flagging.

Some producers argue that levels can be blamed on the US which is considered the price leader with levels rising on the back of firming propylene feedstock costs. These have soared from 9 cents/pound in Q1 to a current level of 19 cents/pound. One producer concedes that the time has come to consider customers more carefully, after complaints that they have become too insensitive to downstream business on which they ultimately depend. But prices seem unlikely to soften whilst global supply remains so tight.

ITALIAN RESINS DISAPPOINT

Italy's plastic and synthetic resins industry continued to perform poorly last year, posting overall sales of L5,100bn ($3.87 bn), down 8.6 per cent on the previous year.

According to figures released by the Italian chemical industry association Federchimica, exports slipped by 0.6 per cent to L2,271bn. With imports rising by 3.1 per cent to L3,203bn, the sector's trade deficit worsened to L931.9bn against L823bn in 1985.

Export volume increased by 5 per cent to 1.34m ton, although imports fared better, up 8.4 per cent to 2.05m ton. Output showed a reasonable increase of 2. per cent against only 0.1 per cent the previous year.

Prices, however, slumped by 12.4 per cent, contributing heavily to the drop in sales value. Domestic consumption of plastic and synthetic resins fell by 5.8 per cent to L6,032bn, having risen by 7.7 per cent in 1985.

UK NATURAL GAS STILL "TOO EXPENSIVE"

The UK chemical industry is paying more for natural gas than its European counterparts, according to a survey by National utility services (NUS). In its annual survey of international natural gas prices, NUS, found that the UK now tops the league at an average cost of £0.342/Therm ($0.554/Therm), a marked change from last year's position when UK gas was cheaper than in Belgium, France and West Germany.

The findings of the survey, carried out among 750,000 businesses worldwide, will lend weight to a campaign started earlier this year in the UK. This was led by the Energy intensive users group, industrial consumers who are protesting at the high prices charged by British Gas, the UK's sole supplier of natural gas. According to NUS, a lot of its supplies are still coming on stream at under £0.08/Therm landed equivalent.

Average of industrial firm gas prices £/Therm

	1987	1986
UK	0.342	0.354
France	0.341	0.421
W. Germany	0.300	0.452
Belgium	0.292	0.396
US	0.278	0.303
Italy	0.223	0.151
Netherlands	0.221	0.210
Canada	0.190	0.202
Australia	0.183	0.163

Reg Legge, energy manager at the UK chemical industries association, has accused British Gas of exploiting its monopoly position. "We are faced with a single supplier which can basically charge what it likes," he says. "It is a ridiculous situation that gas which comes out of the North Sea and turns left into the Netherlands costs £0.10/Therm less than if it turns right and comes into the UK".

An average price reduction of 1 per cent for UK contract supplies this year compares unfavourably with most other countries, says NUS, where decreases have been a high as 33 per cent in the wake of softer oil prices. The survey notes that the price discrepancy is particularly large on interruptible supplies which allow consumers to switch between gas and alternative fuels.

British Gas has also come under fire for its "discriminatory" pricing system, which according to Legge means some customers pay more for interruptible supplies than those on firm natural gas contracts. "Pricing in the UK is at the whim of British Gas", he caims. "The range is as wide as 30-40 per cent, reflecting British Gas's tendency to exploit its monopoly position by charging customers what it thinks they can afford.

TIGHT ETHYLENE MARKET ENCOURAGES PRICE RISE

The steady demand seen throughout Europe's ethylene spot market during September could provide a stable rostrum for producers to raise the Q4 prices to between DM830-850/ton.

Three DM850/ton deals had been concluded for the same customer during the first week of October and others were done in Vienna.

Current third quarter European contract business is put at DM770-790/ton, although one producer noted that the upper limit tended towards DM780/ton for free delivered product. A DM30-50/ton increase on this figure, which is generally predicted from the buyers' Q4 would leave prices around DM810-830/ton, slightly lower than producers expect.

Cracker shutdowns in Europe have left supply short and strengthened price levels. European spot business is being fixed over a wide range of prices from $470-500/ton cif, although the top price quoted seems to have dropped back a little.

Spot liquid ethylene has been moving at $490/ton into Dutch terminals which equates with DM900/ton heard on the ARG pipeline. However, in the Mediterranean a $460/ton deal was concluded.

One of UKW's ethylene crackers at Wessling in West Germany had an unscheduled 10 day shutdown which is estimated to have cost the market around 10,000 tons during its closure. Additionally, two Rheinische Olefinwerke (ROW) crackers are operating below normal rates. The G6 cracker is said to be working at between 50 and 70 per cent of capacity and should be back to normal at the beginning of November. The rebuilt 170,000 ton/year G4 cracker is being commissioned now, rather later than planned. In the meantime, DSM's Number 3 cracker which has been down for maintenance for two weeks already, will be back on stream on November 1. This produces 350,000 ton/year of ethylene and the 5-6 week closure routine will reduce supply by about 30,000-40,000 tons. Neste's cracker at Porcoo is due for a routine shutdown following unexpected problems.

This year, the UK's downstream PE buyers have experienced price rise in excess of 30 per cent, according to the Packaging and industrial Film Association (Pifa) in a review of the supply and price pattern of ldPE.

Price levels have been influenced to some extent by a 13.4 per cent duty imposed on lldPE imported into the EEC from Saudi Arabia. This duty reduced linear stock, low forcing film processors to return to traditional low density grades, Pifa says.

MAN-MADE FIBRES TO STAGNATE

The EEC market for man-made fibres is currently valued at around $4.8bn and will remain stagnant through to 1990, according to a study by analyst Frost & Sullivan. Good performances are forecast for polyesters and polypropylene, but the report says the increasingly superior quality of synthetic fibres will be a major contributor to the EEC's declining use of fibres.

Western Europe produces 20.3 per cent of the world's man-made fibres, the report notes, with the dozen EEC members producing some 17 per cent of the global total.

Production levels, which reached 2.8m ton in 1986, are forecast to remain stagnant, according to the report. A modest rise of 44,000 ton is expected by 1990. Consumption will also remain unchanged at around 2.4m ton.

Imports, however, are expected to climb from 1.5m to 1.6m ton between 1986 and 1990. Exports, says the report, will rise more slowly from 1.9m ton to 2.0m ton.

Synthetics account for around 80 per cent of man-made fibre consumption in the EEC at present. Only polypropylene filament and staple fibres are expected to show any significant growth. By contrast, cellulosics will see a tailing off in production in excess of 2 per cent/year.

The report says West Germany is the largest market for man-made fibres in the EEC with sales of DM1.8bn ($850m) in 1986, around 18 per cent of European consumption. The UK accounts for around 15 per cent with sales of some $585m. Akzo & Enka are shown to be the clear market leader in supplier's market share.

ICI PP SHORTAGE

Polypropylene homopolymer supply in the UK could shorten as technical difficulties at ICI's Wilton plant continue. The company has reaffirmed that a malfunction, which has been going on for several months, is costing it 2-3,000 ton/month in homopolymer supply, but stresses that the plant is operating near 75 per cent capacity. The 2-3,000 ton shortage is said to represent about 33 per cent of ICI's total UK production and some 20 per cent of Western European production.

REPSOL STARTS UP NEW LLDPE FACILITY

Spain's Repsol Quimica (formerly Alcudia) has completed the first phase of an lldPE project at its Puertollano site. Tepsol, which is Spain's largest plastics and petrochemicals producer is spending Pta60m ($4.91 m) converting an existing high pressure ldPE unit to produce lldPE. The project is based on technology developed by its parent Repsol Petroleo (formerly EMP).

The first phase has a capacity of 15,000 ton/year, and this will eventually be raised to 40,000 ton/year when modifications to a larger reactor are completed in 1989. Work is being carried out by Repsol's own engineering department. The company's total PE capacity stands at around 450,000 ton/year, including 310,000 ton/year of ldPE and 140,000 ton/year of hdPE.

BP ENDS ANTWERP EO INVESTIGATION

BP Chemicals has completed its investigation into the explosion at its ethylene oxide plant in Antwerp which occurred on July 3 this year. Details of the report and the inquiry headed by Rerry Lazenby from the company's Grangemouth plant were due to be published at the end of September but have not yet been released.

The polyethylene plant, which was not damaged but closed as precautionary measure, came back on stream at the end of July, and the ethylene norbornene unit was restored to normal in the middle of September. The EO plant which suffered primary damage is expected to take "some time" to repair according to BP, while the units which produce glycols, esters and hydroxy ethyl cellulose, silicone surfactants and polymer polyols could be restored sooner.

SOLVAY DEMANDS AID FOR FRENCH PE UNIT

Solvay Chairman Baron Janssen said that Solvay has made it clear to the French government that it needs an assurance by the end of the year on financial provision to secure the future of a polyethylene plant at Sarralbe or it will be forced to close the unit.

Government-owned CdF Chimie is to close an ethylene cracker at Carling, cutting off ethylene supply to the Sarralbe PE plant in Lorraine. "Our plant was built under pressura from the French government ... we can't afford to have ethylene piped in," Janssen said. Unless the French government pays for a pipeline to bring in ethylene or for the cost of moving the plant Solvay will be forced to abandon it, even though 550 jobs may be affected.

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News from the American market

PRODUCERS RAISE THE PRICES OF VARIOUS PRODUCTS

Price increases for a variety f downstream products will become effective Oct. 1, in actions hat reflect both improving markets and rising costs for raw maerials. Dow Chemical, for example, raised prices for Dowanol EB and DB glycol ethers, and emoved all off-list pricing on tyrene monomer. In two actions hat follow other recent price increases for amines, Borden Chemical raised its price for hexamethylene tetramine by 2 cent/b; and Dow raised off-list prices f aminoethylethanolamine by 7 cent/lb, effective Oct. 1 or as contracts allow. In another action, W.R. Grace raised prices f nitrilotriacetate. BASF Corp's Chemicals Div. raised bulk prices for Pluronic and Tetranic urfactants by 4 cent/lb, and Plurafac alcohol alkoxylates by cent/lb. The company also dobled drum differentials to 2 ent lb.

The price structures of some roducts have been weak. In ne action that runs counter to ne current trend of higher prices, lewport Div. of Reichhold Chemicals reduced its prices for all erpene-phenol resins by about %. Newport says the reducon "reflects a recent softening phenol pricing." Air Products ithdrew previously announced ept. 1 price boosts for methylmines and morpholine and posd lower list prices on methylmines. The list price of anhyrous methylamines fell back to 7 cent/lb, from 56.5 cent/lb, olution methylamines to 45 ent/lb, from 65.5 cent/lb, both eight collect. The list price r morpholine remains at 94 cent/lb freight prepaid, instead of rising to $1.04/lb. FMC's Lithium Corp. of America subsidiary shaved its recent price boosts for lithium products, with revised Oct. 1 prices ranging from $1.55/lb for technical lithium carbonate to $15.79/lb for n-butyl lithium in cyclohexane. The price increase for sec-butyl lithium holds.

A STRONG START FOR FERTILIZERS

Shipments by U.S. fertilizer producers in July and August, the first two months of the 1988 fiscal year, were substantially higher than those of the year-earlier period. Disappearance into trade channels rose 22% for nitrogen products and 13% for phosphate products. And, although shipments of U.S. potash producers fell 3% in the period, Canadian producers shipped 41% more of the material, pushing total North American shipments of the material 32% above those of a year earlier. U.S. nitrogen producers inventories fell 21% as production rose only 4% in the period, lagging well behind the rate of increase in shipments. Phosphate output, however, was up 18%, outpacing the shipment gain, and inventories were 2% higher on Aug. 31 than they had been a year earlier. Shipments of phosphate rock, the raw material for phosphate fertilizers, rose 21% in the period.

PENNWALT RAISES ITS WEST COAST CHLORINE PRICES

Pennwalt raised prices of chlorine for customers of the company's plants in Portland, Ore., and Tacoma, Wash. Prices of chlorine in 1-ton containers and cylinders are up 1.5 cent lb. Prices for 1-ton containers range from 17.5 cent lb for 75 tons to 23.75 cent/lb for 1-10 tons. The new price for chlorine in customer-owned cylinders is 26.5 cent/lb, f.o.b. seller's plants; use of Pennwalt-owned cylinders costs an additional 3 cent/lb. Pennwalt also raised the price of hydrochloric acid for customers of its Portland and Tacoma plants, effective immediately on spot business and as contracts permit. The increase is $5/ton, to $80/ton, for 20° material and to $87/ton for 22° HCl.

TITANIUM DIOXIDE PRICE MOVES CONTINUE

Marketers are continuing to raise prices of titanium dioxide. Following increases by U.S. producers, Holtrachem (Natick, Mass.), which imports and distributes titanium dioxide manufactured by France's Rhone-Poulenc, raised its list price for titanium dioxide anatase slurry by 3 cent/lb, to 82 cent/lb. Holtrachem imports the material in powder form and has it made into slurry. The company is an importer and distributor of chemicals, whose major line is chloralkali products. Marketers point out that the increase on titanium dioxide is moderate — about in line with inflation. The market tightness is leading to expansions: Last month, Kerr-McGee said it will add 21,000 metric tons/year at Hamilton, Miss. Now, Hanson Trust says it will spend $18 million to expand by 18 million lb/year the TiO_2 capacity of its SCM Chemicals unit's plant at Ashtabula, Ohio. That expansion, together with expansions in England and Australia, will bring Hanson's worldwide TiO_2 capacity to 431,000 m.t./year by the end of 1988.

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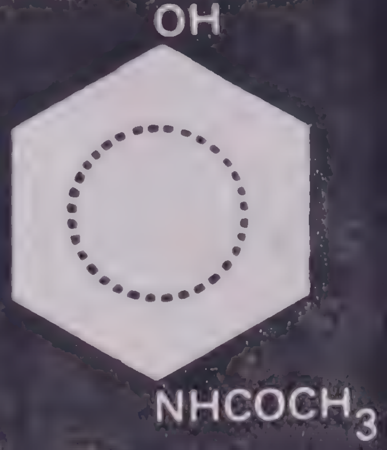

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Environment

ROTTERDAM REJECTS DAM PLAN

The Municipality of Rotterdam, which has authority over the recently opened Slufter Dam on the Maas plain, has rejected a proposal from Neelie Smit-Kroes, the Dutch minister of waterways and traffic, for disposal of cadmium-containing gypsum from DSM and Windmill.

The Slufter Dam was built for the disposal/storage of polluted waste soil. Storage there of gypsum tainted with cadmium from Windmill and DSM was thought to be a solution for the two fertilizer producers until they develop an alternative process that produces far less cadmium waste.

Both companies have a licence from the Dutch government to dump the gypsum into the North Sea but this is due to expire July 1, 1988 and the government has no intention of renewing the licence. The fertilizer makers contend that new methods will not be available until the mid-1990s.

MEPs BACK EEC REGULATIONS

Members of the European parliament are backing two proposals from the commission designed to regulate export of hazardous materials and worker exposure to benzene. But the parliament has suggested some minor changes to the export proposals.

The commission's proposal on the packaging and labelling of banned and severely restricted chemicals intended for export to mainly developing countries now includes two new requirements. Instructions for use must now be written in the most widely-used language of the country of destination, and technical assistance including training in the use of the products should be provided.

The parliament has also approved the commission's plan to fix the benzene exposure limit to 5ppm for each eight-hour period. At the moment only Denmark has this level as the permissible maximum. The UK, West Germany, Italy, the Netherlands, Eire, Belgium and Luxembourg have 10ppm as the maximum level while France permits exposure upto 25ppm.

European firms will now be urged to replace benzene with less hazardous substances where possible and ensure work requiring the use of benzene is forbidden to workers under 18 years old, and pregnant and nursing women. The commission hopes to curb the maximum level further to 3ppm by the end of 1991.

MEPs CRITICIZE EEC PLANS

Members of the European parliament's economic and social committee have criticized a number of proposals from the European commission for not going far enough. The committee has given its opinion on proposals concerning occupational exposure to biological and chemical agents and EEC standards for cosmetics.

While accepting the commission's proposals on occupational exposure makes a contribution to worker safety, the committee claims that the plans do not go far enough. According to the committee, the commission has been guided by short-term considerations but should have developed a long-term strategy.

When drafting the list for occupational exposure limits the commission proposed the highest level permissible in member states when a consensus could not be reached. The committee argues that limits should be set to protect the health of workers as best as possible.

While welcoming the proposal which amends for the fourth time the EEC directive on cosmetics standards, the committee has called on the commission to reconsider banning or severely restricting the use of some substances. Moreover, the committee is recommending that the commission review the possibility of introducing preventative measures to curb occupational exposure to some substances.

The committee supports the commission's five-year programme to determine the job creation potential of environmental protection. The committee however, is calling on the commission to promote projects that increase collaboration between various parties such as member states, private companies and trade unions.

Meanwhile, the European parliament's economic and social committee has asked the commission to keep it informed of the progress of the programme.

COPPER PRICES CONTINUE THEIR SURGE

Futures markets indicate that the copper price increases are likely to continue. The price of futures on the New York Commodity Exchange has continued basically firm, and contracts as far out as March 1988 matched the strength in the expiring September contract. A Sept. 17 doubling of the margin by the exchange led to some profit taking in the next few sessions, but market observers are forecasting even higher prices. Producer prices, meanwhile, hit 90 cent/lb and copper scrap prices held at 66-67 cent/lb.

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Biotechnology

ENERICS UK WINS DRUG ASE

The European Court of justice s ruled that Generics UK was scriminated against when it at- mpted to import salbutamol, the anti-asthma drug belonging Glaxo subsidiary Allen and nburys, from Italy into the UK.

Back in 1983 Generics reques- d a licence to import the drug om Italy but Allen and Hand- rys refused. In spite of that re- sal, which was backed by the K comptroller of patents, Ge- erics proceeded to import the ug. Allen and Hanburys, fear- g infringement, obtained a rul- g from a UK court to halt the ports.

The UK House of Lords asked e court of justice to make a ling on whether a company can event importation of one of its oducts coming from another ember state where the product not patentable and has been ade without the patent holder's nsent. The court has now ruled at UK law does not allow Allen d Hanburys to refuse a licence UK manufacturers.

Over the years when drugs ere not patentable in Italy, Ita- an drug firms were able to de- lop drugs without the expen- ve R&D commitment. Now the EC accession treaty has a clau- which prohibits imports until 995 of pharmaceutical products ade in Spain and Portugal into her member states. Pharmace- ical products in these two cou- ries were not patentable until cently.

ELGIAN RESEARCH

Beecham Reports that it has ent more than BF600m ($1.5m) over the past three years ex- nding its research facility at Heppignies near Charleroi, Belgium. In an agreement with the Belgian government in 1985 the UK firm pledged to spend BF-200m.

The company is now hoping that the Belgian authorities will take this level of commitment into account when deciding pricing policies for some of its drugs. Beecham has recently won approval for its blood clot buster Eminase and an Augmentin formulation.

HIGH TECH SECTORS WILL SEE BEST GROWTH SAYS EDC

Prospects for the UK chemical industry look most favourable for the innovation-driven sectors of the business. Growth rates for specialized organics, pharmaceuticals and agrochemicals are all expected to exceed UK gross domestic product growth over the next five to ten years, according to the UK chemicals economic development committee.

Current output for specialized organics is valued at about £1.7 bn ($2.8bn). This sector is expected to grow between 2·3 per cent above GDP and the UK is expected to maintain its share of the $90bn global market.

The outlook for agrochemicals appears rosy in spite of the downturn in the agricultural market. The UK share of the global market stands at 8 per cent and innovation will be a key determinant if this share is to be either maintained or raised.

Similarly the pharmaceuticals sector relies on the ability to discover and develop new products. The growth rate for world pharmaceuticals demand is likely to slip back to the level of GDP growth as many countries seek to contain healthcare spending. Nevertheless, the EDC predicts that the UK share of markets is likely to increase over the next five years.

In all these sectors, the cost of developing new compounds is expensive. Biotechnology is likely to play a very important role in the agrochemical and pharmaceutical research efforts. The EDC is urging the government to take account of a number of its recommendations to ensure the maintenance of competitiveness in these sectors.

The committee urges the government to respond to industry's need for competitive and stable exchange rates; provide attractive incentives for research and investment; improve the framework for research and education; and promote inward investment.

The pharmaceuticals sector would benefit from the "abolition of the 1977 patents act licences of right provision' to bring the level of protection in the UK up to that of other countries." The comittee also urges development of better procedures for controlling parallel imports.

According to the UK cemical industries association "the growth and prosperity of the UK chemical industry is becoming more dependent than ever on the success of new research and devecopment efforts." New niches can be explored to offset the relative stagnation of some existing sectors.

The CIA, last year, proposed priority areas for chemicals R&D: electronics, advanced materials, healthcare, agriculture and food, safety, environmental control and energy.

GERMAN DRUG FIRMS SLAM APPROVAL RED TAPE

An administrative court in West Berlin is expected to rule within the next few weeks on a suit brought by 30 West German pharmaceutical makers against the federal health authority (BGA).

The producers claim that BGA is not upholding German drug laws which stipulate that applications for registration of new drugs be approved or denied within a period of four months (six months in exceptional cases). The drug makers say that registration procedures are taking at least a year and sometimes upto two years.

While the BGA does not deny that delays exist, Dieter Grossklaus, BGA president claims, that the situation is unlikely to improve within the near future as the authority is understaffed. A change in pharmaceuticals laws requires the re-registration of drugs commercially available before 1978 adding extra pressure.

Grossklaus explained that the number of applications still undecided had risen to 8,000 by September, as many as were processed during the whole of 1978, Although new jobs had been created there was still not enough personnel to deal with the enormous volume of work. The BGA president criticized German drug laws which require the "same careful testing procedure to be applied to medicinal waters as to an Aids drug."

According to a spokesman for the German pharmaceutical industry association, (BPI) producers are asking in the lawsuit that temporary staff be hired or transferred within the health authority to relieve the current impasse. He said drug makers have also volunteered to help authorities by providing detailed information on a list of 100 substances. "While they wait for registration their patents are running out," he added.

Meanwhile, the US is making great strides to cut red tape and streamline the bureaucracy of the food and drug administration. Already new rules introduced in the summer allow firms to start selling experimental drugs that have shown some promise. Now the agency is to be restructured and a centre for drug evaluation and research is to be established.

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CONGRESS REVIEWS ORPHAN DRUG ACT

Members of the US congress are preparing to review the orphan drug act which was designed to give pharmaceutical producers an incentive to produce drugs that treat rare disorders and hence have restricted markets. Products given orphan drug status are granted several years marketing exclusivity under the existing rules.

The push for a congressional review may have been prompted by a legal dispute between Genentech and the food and drug administration (FDA). Genentech challenged the FDA's right to grant orphan drug status to a genespliced human growth hormone made by Eli Lilly. Genentech was awarded what it believed to be a virtual US sales monopoly for recombinant growth hormone at the end of 1985.

Genentech argued that the FDA should not be able to consider requests from other comanies seeking marketing approval. A US federal circuit court udge has, however, upheld the DA's decision to grant orphan rug status to the Lilly product.

Congress may now be looking o amend the orphan drug act to lear up any confusion. Officials t the FDA claim it is too early o determine what changes may ccur. Nevertheless there is the ossibility that changes to the xclusivity clause may be proposed which will allow more than ne company mark protection.

Even though the proposal met recent deadline on introduction nto the current congressional session, it is unlikely to be considered until next year. Such congressional reviews normally ake up to two years to complete.

CETUS GENERIC WINS APPROVAL

Officials at the US food and drug administration have granted Cetus-Ben Venue Therapeutics approval to market leucovorin calcium, a drug frequently used in combination with the anti-cancer drug methotrexate. This is the third generic drug to be marketed by the Cetus-Ben Venue joint venture.

Cetus is using the experience of marketing generic products to establish itself in the market-place prior to the introduction of its own bio-technology-derived cancer therapies. Interleukin-2, the company's potential cancer drug, is expected to win approval half way through 1989.

ICI EYES JAPAN

ICI is committed to expansion in Japan and the Far East and will pursue a strategy of acquisitions and joint ventures to fulfill this goal, according to chairman Denys Henderson.

The ICI chairman is currently touring the Far East, stopping in Japan, Korea and Hong Kong, and has been meeting representatives from business, the scientific community and government.

In Japan, Henderson opened a new multi-million pound R&D centre at Tsukuba, near Tokyo which is developing high-technology advanced materials, speciality chemicals and products for the electronics industry. The centre is designed to enable ICI to work more closely with customers and tailor products specifically for the Japanese market.

Henderson also met members of Japan's financial community to explain why he believes that ICI offers a good opportunity for investors.

UK SEEKS TO EXTEND GENE-SPLICED RULES

Officials at the UK Health and safety commission are proposing changes to the rules regulating genetic manipulation that will extend the requirement for notification and risk assessment. The HSC intends to extend the scope of the current regulations which are covered by non-mandatory schemes.

The commission is planning to make notification of the use of gene-spliced organisms compulsory, particularly those in large scale and industrial usage. It also intends to make compulsory the notification of planned release of gene-spliced organisms into the environment.

Other changes proposed in the HSC's consultative document include the requirement to notify the health and safety executive of planned experiments with risk assessments and the establishment of safety committees to oversee genetic manipulation.

It is also envisaged that new regulations will close two loopholes in the current legislation. The new rules will cover the transfer of all foreign DNA into cells such as microinjection and the deliberate release of genetically-altered material from offshore installations.

While the regulations will be designed to tighten up the existing rules in some areas there will be relaxation intended to cut red tape. Those areas defined as low risk will not require full details of experiments although all laboratories will be required to conduct their activities according to best known practices.

The proposals have been developed by the Health and safety commission after discussions with the advisory committee on genetic manipulation. The commission claims that its plans have been well received by industry. All interested parties are now invited to tender their views to the commission by December 18, 1987.

Once the comments have been reviewed the commission will draw up a final version of its proposals for new regulations and present them to the government in the spring of 1988. While the process will depend largely on the parliamentary timetable, the commission is confident that the rules will become law by next summer.

SECOND THAI PROJECT

A meeting of government officials and chemical industry representatives in Thailand has agreed that the country should proceed with the development of a second petrochemical complex.

The cost is estimated to be around $1.4bn and the meeting agreed that the complex is economically viable.

Technological Scene Abroad

SUCCESSFUL CLONING OF CATTLE

Cloned female calves have been born at the University of Wisconsin (Madison) as a result of a joint research project between the university and W. R. Grace's American Breeders Service Div. The feat, says Grace, advances its goal of reproducing the best traits of genetically superior breeding stock in commercial dairy herds. University of Wisconsin Professor Neal First took nuclei from 16-cell bovine embryos and placed them in one-cell bovine eggs from which the nuclei had been removed. The one-celled embryos were then transferred into recipient cows, which gave birth to the calves. The method potentially can produce large numbers of genetically equivalent animals, says Grace. Multiple-cell embryos can be divided and each cell can be used to grow other embryos. Some of the embryos can be transferred to surrogate mothers to produce genetically equivalent cows, or the embryos can be divided again, so multiplication of a single embryo is potentially unlimited.

A JOINT VENTURE IN CERAMIC-METAL COMPOSITES

The development of toughened ceramic-metal composites for high-temperature and ballistic applications is the aim of a joint venture between Lanxide (Newark, Del.) and Du Pont. Lanxide has what Du Pont calls "unique" technology in ceramic-metal composites. Lanxide's technology could entail relative ease of fabrication and the incorporation of a wide range of materials to tailor properties. It also may be able to make large parts and complex parts that require little machining. Lanxide's technology, however, is still "developmental," cautions Phillip L. Wagner, Du Pont's technical manager of the programme. Under terms of the agreement, Du Pont will take the initiative with customers in the aerospace, turbine engine and heat exchanger markets. Lanxide will assume leadership for ballistic applications, such as armor. Du Pont sees a potential multi-billion-dollar market for ceramic-metal composites technology.

SOLVING ENGINEERING PROBLEMS ON A SUPERCOMPUTER

A fluid dynamics and heat-transfer software package, called the first commercial application package for a large-scale parallel computer, has been introduced by Intel Scientific Computers (Beaverton, Ore.) and Nektonics (Bedford, Mass.). The package, called Nekton, runs on Intel's iPSC-VX vector concurrent supercomputer. The system is designed to solve a variety of two- and three-dimensional problems. According to Intel, an example simulation that takes four hours to run on a VAX 8600 computer requires three minutes to run on a comparably priced iPSC-VX system. "When half a day of simulation can be reduced to the time it takes to go for a cup of coffee, there will be significant changes in the way engineers do their work,' declares Elliot Swan, Intel's market development manager. The Nekton system may be leased or purchased, with prices ranging from $55,000 to $90,000, depending on size.

LOW-COST DETECTION OF EXPLOSIVE MIXTURES

A device that can cut the cost of infrared detection of explosive mixtures of all hydrocarbon gases and vapors has been invented by Shell Research at its Thornton Research Center, near Chester, England. The device uses the beam method, also employed by gas laser detectors, but does not require the same high-voltage power supply and safety measures. John Cole and Stephen Skippon, who led the team that invented the new detector, will not disclose the infrared source. They say only that it is a low-cost source, operating at voltage and power levels "sufficiently low" to ensure that escaping gas will not be ignited. They point out that the device has "nearly the same sensitivity" to all hydrocarbons, while most other detectors are less sensitive to methane than to heavier hydrocarbons. A trial unit began operating at Shell U.K. Exploration and Production's natural gas liquids processing plant at Mossmorran, Scotland, last November. Sieger (Poole, England) has been licensed to manufacture and sell the device worldwide. "A significant engineering still has to be done on the device," says Sieger's technical director, David Balfour. The company is aiming for commercial debut in late 1988. Equipment prices have not been estimated, but Balfour expects a cost reduction factor of 10 over the cost of gas laser devices.

News About New Projects

URKISH TRADER IN TYRENE, PS INVESTMENT LANS

The Turkish trading company enta Dis Ticaret is to build a yrene monomer plant at Aliaga ccording to Nesrin Erem, executive director of the company's hemicals trading division. If he project is successful there re further plans for a polystyrene plant, Erem says.

The company is actively seeking a foreign partner, possibly a apanese or US contractor, to elp finance the 100,000 ton/ear facility which is expected to ost not less than $100m. The artner, which will supply technology for the plant, is to have a 9 per cent share in the project ays Erem. The result of the orthcoming Turkish elections will be a significant factor in the nancing of the project. Penta is oping to get extra credit from he new government. Discussions were also held with Nefechimexport of the USSR on this s well as a new methanol plant.

Construction is scheduled to start next year at a site, as yet not finalized, close to Petkim's Aliaga complex from which it will source its benzene feedstocks. It could also take benzene from the Soviet Union or Bulgaria.

The need for extra styrene capacity in Turkey is driven by growing demand for polystyrene. Current demand is 40,000 ton/year and this, says Erem, is set to rise to 50,000 ton next year, and 60,000 ton the year after. Penta provides 36,000 to 37,000 on/year of the current demand from Petkim — which produces 25,000 ton/year — and other sources. But the market is very tight; Bulgaria is short of styrene and may be interested in a tolling deal for benzene.

Petkim's styrene plant at Yarimca is small and based on relatively old technology. Last year when styrene could be bought on the open market for $490/ton the Petkim plant was producing at a cost of $1,050/ton so the plant was shut down. This year, when prices topped $1,125/ton it reopened. Erem estimates that Penta's plant will have a running cost of no more than $700/ton.

Penta had a turnover of $150m last year. In the first six months of this year it recorded export volumes to the value of $125m and import volumes worth $40m. Much of its business is with Petkim.

As a trader, the company buys ldPE, polypropylene, polyvinyl chloride and aromatics such as benzene and paraxylene, and other chemicals from Petkim. It also supplies propylene to Petkim from Italy, and in the last 18 months has supplied the company with styrene monomer from Atochem, Enichem and Sabic.

Before settling on styrene the company considered other products. One candidate, says Erem, was polypropylene for which there is also a shortfall in Turkey. For this, however, it would have been dependent on imported propylene.

DU PONT ldPE PROCESS FOR KOREA

Du Pont Canada and Yukong Ltd. of South Korea have signed a licence agreement for Du Pont's **Sclairtech** polyethylene technology. Under the deal Yukong will build a 12,000 ton/year linear low density polyethylene plant at Ulsan.

Yukong, formerly known as the Korean Oil Company, has embarked on an expansion programme aimed at achieving world rank as an integrated energy and chemical company. Earlier this year the company awarded a major contract to M. W. Kellogg to build a world-scale ethylene cracker at Ulsan.

Under the latest agreement Yukong will use Du Pont's process to produce a full range of linear low, medium and high density products. The two companies also intend to co-operate in marketing and in R&D.

Basic engineering for the plant will be performed by Lummus Canada. Yukong says that serious discussions with several other companies are now under way for engineering and construction of the plant.

"The selection of Du Pont's solution process over several alternatives reflects the growing awareness in the industry of the quality, economic and flexibility advantages offered by our process," said D. W. Boivin, Du Pont's director of licensing. "The polyethylene market continues to demand a range of high-quality products which can only be achieved with a versatile process that has the capability of rapid grade changes," Boivin said.

This is the second **Sclairtech** licence agreement signed by Du Pont in 1987. Reliance Industries of Bombay, India is planning to build a plant at Hazira.

Yukong's contract with Kellogg, signed at the start of this year, forsees the construction of a plant with a capacity in excess of 350,000 ton/year of ethylene, using the Kellogg Millisecond technology. The contractor is designing both naphtha and ethane cracking furnaces for the plant, as well as basic engineering for a butadiene extraction unit and pyrolysis gas hydrotreater.

Arco and Yukong plan to build propylene oxide and styrene plants.

SHINTECH HIKES US PVC CAPACITY

Shintech Inc, a US subsidiary of Shin-Etsu Chemical of Japan, has announced plans for a two-part expansion which will result in a 227,000 ton/year increase in Shintech's polyvinyl chloride resin production capacity at its Freeport, Texas, facilities.

Work on the project, costing in excess of $100m, has already started and the first phase, which will add some 113,500 ton/year to capacity, scheduled on stream by October 1988. The additional 113,500 ton/year, due on stream two years after the first phase is completed, will come from process improvement and debottlenecking programmes.

Shintech will use its proprietary PVC technology in combination with the most advanced and efficient PVC process know-how from Shin-Etsu, the world's largest licensor of PVC technology.

Because of its product quality, uniformity and reliability, Shintech has enjoyed continued growth from an initial capacity in 1976 of 100,000 ton/year to its current capacity of 454,000 ton/year. The expansion will raise the capacity of Shintech's two plants at Freeport, Texas to 681,000 ton and put it on the same level as the current US leading producer, BF Goodrich, which has a nameplate capacity of 681,000 ton/year.

Total US PVC capacity is estimated at 3.4m ton/year. Other major producers include Borden Inc and Occidental Petroleum. The US market will absorb a major portion of the product but some will also be exported.

The company declined to reveal where it intends to obtain its vinyl chloride monomer feedstock but said that the present plants are connected by a pipeline to Dow's Freeport complex.

ICI FORCED OUT OF CHLORALKALI PLAN

Strong objection from the local community have forced ICI Australia to abandon plans to build an Aus$24m ($17.5m) chloralkali facility at Lytton, Queensland.

The project, according to an ICI spokesman, got caught up in Australia's internal politics. "Employees of ICI Australia were harassed and the company decided it could not let this happen," he said.

The project has undergone extensive evaluations and has been declared safe by the consultants Cremer & Warner. Work on the plant, which was to have used the FM21 technology, commenced in May 1986. It was to have served the water purification market as well as the general chemical industry.

STATOIL AND HIMONT LINK IN ANTWERP PP PROJECT

Statoil, Norway's state-owned oil and chemicals group, has announced details of its long-mooted polypropylene expansion plans. The company has joined forces with Himont, the world's largest polypropylene producer, in a plan to set up production at Antwerp in Belgium.

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sin and propylene monomer, mplex has been formed. The w facility will be designed to oduce 300,000 ton/year of a w generation PP homopolymer d copolymer resins. It will be ilt in two phases with the first 50,000 ton/year line scheduled n stream in 1989. Himont's pheripol process to produce the ost advanced types of PP re- ns will be used.

The partners declined to re- al the total cost of the project ut Statoil said its share of the st phase of the scheme will ost Nkr600-650m ($90-97m).

The joint venture will also pro- uce propylene monomer on site y 2 routes — through propane ehydrogenation and through the se of a splitter facility to upgra- e propylene from refineries and ther sources. The complex will ave facilities for storage and erminaling for export and im- ort.

The combination of Spheripol echnology with a capitive sour- e of propylene monomer will ake the joint venture the most ost effective producer in the orld, the partners declared. ach company will market the olypropylene separately.

Statoil's existing polypropyle- e facility operated by Norpole- n at Bamble in Norway has een debottlenecked to 90,000 n/year at a cost of Nkr100- 50m and plans are in hand to ise output to 120,000 ton/year, ventually giving Statoil a total pacity of 270,000 ton/year and fth or sixth position in Europe. he timing, however, will depend n the market situation. Norpo- fin, currently a joint venture ith Norsk Hydro, becomes a holly-owned Statoil subsidiary n January 1, 1988.

Arve Johnsen, president of tatoil, said the plants in Nor ay and Antwerp will provide Statoil's customers with advanced materials for a wide range of applications, and Statoil has the option to use Himont's technology for further PP expansion in Europe.

Johnsen emphasized that the agreement envisages a broad range of potential co-operation between the two companies including high technology application development in the Nordic area.

Some of the feedstock will come from Statoil's cracker in Stenungsund, Sweden, where the company produces around 190,000 ton/year of propylene. Himont is believed to have agreed to propylene price ceiling on its supply. The splitter will produce in the region of 100,000 ton/year of propylene from, among others, the Mongstad refinery propylene, and the dehydrogeneration facility will yield between 200-250,000 ton/year of propylene. Talks are under way, with Air Products and UOP on the possibility of acquiring technology for this unit.

Alexander F. Giacco, chairman and chief executive officer of Himont, a Montedison subsidiary, said that this is a particularly significant venture for his company in relation to increasing its market share in PP and to strengthening its worldwide monomer position.

Himont, Giacco said, is determined to increase its worldwide market share in PP to 25 per cent and to keep market leadership in Europe. Currently the company operates 1.6m ton/year capacity with over 20 per cent to the European and North American polypropylene market.

"We plan to increase market share by exploiting our product technology, by making acquisitions and, perhaps, by developing other joint ventures. And we will retain our market leadership in Europe by recovering most of the 200,000 ton/year of capacity in Northern Europe we gave up through shutdowns and asset sales," said Giacco.

Himont's second objective in the joint venture was to increase its monomer supply coverage by gaining access to propane/propylene feedstock. This will help it become independent of oil and naphtha fluctuations. The propane dehydrogenation process is a unique approach to obtaining the single monomer with no byproducts from secure North Sea propane supplies. The economics of this process for a European plant are seriously doubted, however.

The joint venture's propane dehydrogenation brings some specific benefits to Himont, Giacco emphasized, however. First, it balanced the company's raw material position in Europe, particularly in Northern Europe. Second, the joint venture raises Himont's worldwide monomer coverage to 50 per cent and offers the opportunity to become completely self-sufficient in monomer by importing propylene from the joint venture, the chairman said. Himont buys 1.36m ton/year of propylene for its worldwide operations.

The joint venture and the consolidation of Himont's compound and alloys business in Europe at 100,000 ton/year, represents the completion of all the goals Himont set out for phase one of its strategy. In the near future, Giacco said, the company will announce the first steps in phase two, its entry into the engineering plastics sector.

Polypropylene is the fastest growing plastic with world-wide growth rates estimated by Giacco to be at 10 per cent/year. He sees exciting prospects in markets for baby and adult diapers and the displacement of various engineering plastics such as polycarbonates. ICI and Shell, however, predict growth of 5-6 per cent a year. This year, world demand grew by 800,000 ton.

In terms of its licensing programme this is the 48th licence granted for Himont's PP technology, 14 of them in this fiscal year alone. Approximately 60 per cent of the world's PP is already manufactured under various licences from Himont and the company expects to increase this share to about 70 per cent of world production over the next few years, Giacco said.

"We' re going to be the MacDonalds of the plastics business," he adds, nothing that Himont has not yet lost a technology licensing battle in a developing country.

By 1990, Himont should have $1bn cash ... which it will spend in the advanced materials business. Giacco's optimism for PP is such that he admits to his ambition to buy Himont, which, he believes, is unbeatable in the business. "I worry about Shell getting bigger but I don't worry about smaller or newer competitors," he confides.

Himont is currently running a pilot plant to test its Spheripol technology for PE production and is looking to commercialize this technology. Himont itself will not diversify into PE production, however, Giacco said.

AIR LIQUIDE-DENKA JOINT VENTURE

France's Air Liquide and Denki Kagaku Kogyo (Denka) of Japan have signed a joint venture agreement to produce monosilane gas at Omi, near Niigata. The unit, due on stream at the end of 1988, will make very pure gas at a rate of several ton/year.

The gas will be used to make new generation electronic components. Air Liquide has the exclusive rights to market the product world-wide.

The French group, which currently has 18-20 per cent of Japan's industrial gases market, is expanding its Tsukuba-based research unit which concentrates on sophisticated industrial gases.

In the last three years Air Liquide spent FF7bn on investments and FF9bn on acquisitions. The US Big Three cost FF7bn and gave the group 20 per cent of the US industrial gases market. The Japanese project is part of the company's strategy to expand in Southeast Asia. Denka will hold 51 per cent in the new venture, to be called Denal Silane KK, and provide process knowhow.

SINO-ARAB NPK PROJECT SUSPENDED

The Sino-Arab Fertilizer Co has suspended plans to build a $50m fertilizer complex in China. A letter of intent awarded to Spain's Dragados y Construcciones in June last year has not come into effect. The price appears to be the main stumbling block.

Dragados will have to bear the costs relating to work it has already carried out. Plans envisaged building units for the production of 520,000 ton/year of NPK fertilizers at Quinhuangdao in China's Hebei province.

The Sino-Arab Fertilizer Co is a joint venture between the Petrochemical Industries Co (PIC) of Kuwait (30 per cent), Siape of Tunisia (30 per cent) and the China National Chemical Construction Corp (40 per cent).

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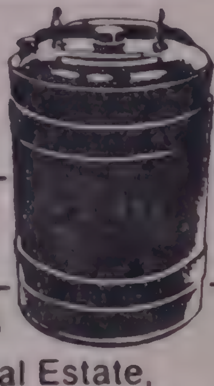

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In the European market

Naphtha prices dipped to $164-169/ton cif NWE in reaction to news that Saudi Arabia may review its crude pricing system, but prices had already started recovering. Demand has been steady in Europe, and prompt supply is tight. Supply tightness is also buoying up prices in the Med following a flurry of demand from Italy and Spain.

Ethylene prices remain firm but have dropped a little to $480-500/ton, with some business done at $470/ton. Spot prices out of West Germany, Benelux and the Mediterranean remain around DM900/ton. The ARG pipeline into West Germany is tight and supplies are expected to be short into mid October. May Q4 contracts are settling between DM 830-850/ton.

Cracker shutdown have left **propylene** short with prices setling between DM580-590/ton fob Rotterdam. Some producers believe prices could firm above DM600/ton as stock levels dwindle. US prices are strong at 19 cents/pound on the back of high derivative demand and producers are pushing for a 2 cent/pound increase on October.

Very tight supply coupled with strong demand from, the US and Far East have combined to force up prices of **butadiene** further to $580-590/ton fob. East European material is fetching $600/ton free delivered, and even higher prices are expected within the next couple of weeks.

Styrene prices have made a dramatic recovery on the back of forecast supply shortfalls due to plant problems. A US technical shut-down, together with ethylene shortages for Brazilian production are combining to take a large slice out of the October-November styrene markets. Prices have jumped to $1,230-1,240/ton fob for T2, and $1,140-1,160/ton cif NWE for T1. US Gulf prices have risen to at least 55 cents/pound.

Benzene prices are steady, but higher toluene prices are adding stronger undertones. Trading has been active for exports. US prices are steady at 93-94 cents/gallon. A flurry of gasoline demand has pushed up **toluene** prices by around $25/ton for T2 material to $220-230/ton. T1 product is expected to move in line with T2 shortly. Meanwhile, T2 has traded at $225/ton.

Xylenes prices are steady at $230-240/ton, and revived gasoline activity may add some strength. Meanwhile, solvents and virgin xylenes business is thin.

Paraxylene prices have firmed up slightly to $320-330/ton on the back of a DM660/ton fourth quarter contract price settlement, It appears that the new contract price, recently settled between Dynamit Nobel and Veba Chemie of West Germany, has been widely accepted by the market.

Spot **methanol** prices are stable in dollars at $125-130/ton fob, but the slightly firmer US dollar has raised European prices to DM232-237/ton fob. For the same reason, T1 prices have slipped slightly to $105-107/ton cif.

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Phenol/MEK shortage continues

There has been no prominent transction after the festivities of Diwali nd the demand in general has fallen. henol and MEK shortage continues to hit the market.

In the Dyes Intermediate section price of MPD has risen by Rs. 10 per kg. Shortage of alpha naphthol persists.

The Dyes however remained steady during the week.

(Prices as on 29th October, 1987)

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mmonium phosphate (DI)	12.00
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crylamide	57.00
arium carbonate	6.00
leaching powder (33% Cl)	4.00
orax (Granular)	14.00
orax (Powder)	15.50
Boric acid (Tech.)	22.90
Bisphenol-A	58.00
Butyl carbitol	35.00
Caustic soda (Flakes)	7.60
Caustic soda (Solid)	7.75
Caustic soda (Lye)	6.00
Calcium chloride 70% (solid)	3.25
Calcium chloride 75-80% (fused)	3.50
Calcium chloride 96% (Anhydrous)	6.00
Calcium carbonate (PPT)	3.00
Calcium carbonate (Activated)	3.55
Camphor (Indian)	90.00
Cresylic acid	49.00
Cream of Tartar (Tech.)	64.00
Citric acid (Belgium)	40.00
Citric acid Indian	39.75
Copper sulphate	15.75
Chromic acid	40.00
Cyanuric chloride	95.00
Cobalt oxide	280.00
Carbitol	52.00
Dicalcium phosphate (Anhydrous)	16.00
Ferric chloride (Lumps)	5.50
Ethylene urea	56.00
Glue flakes	8.45
Glue sheets	6.75
Gohsenol GH 17	72.00

For Your Regular Supply at Competitive Rates :

WHITE PASTE FOR KHADI PRINTING

— ON COTTON, POLYESTER/COTTON, NYLON

(Excellent Fastness, Withstands Carbonising and
Alkaline Wash with Hydro & Caustic)

— NO CURING REQUIRED

Contact MANUFACTURERS and IMPORTERS :

Visen Chemicals Pvt. Ltd.

222/A, Virwani Industrial Estate, Western Express Highway,
Goregaon (East), Bombay-400 063. **Phone : Resi.: 6722385**

Hydro	33.00
Hyflosupercell	17+ST
Hexamine	29.00
Industrial Wax	25.00
Litharge	22.00
Lead Acetate (Tech.)	26.00
Lithopone	35.00
Magnesium chloride (crystal)	3.00
Menthol crystal (Flakes)	185+Ex.+ST
Menthol bold	205+Ex.+ST
Menthol crystal bold	245+Ex.+ST
Magnesium carbonate (Japan)	16.00
Magnesium carbonate (Indian)	15.00
Maleic Anhydride (per kg)	44.00
Mercury (75 lbs)	5,500.00
Nickel chloride	49.00
Oxalic acid	21.00
Peppermint oil (Rectified)	90+Ex.+ST
Potassium carbonate (Indian)	19.00
Potassium carbonate (Imported)	21.00
Potassium bichromate	22.00
Potassium phosphate (Mono)	14.00
Potassium phosphate (DI)	14.00
Polyvinyl alcohol (No. 117)	88.00
Polyvinyl alcohol (No. 173)	90.00
Polyvinyl alcohol (No. 208)	89.00
Paraformaldehyde	15.30
Phthalic anhydride 96%	23.50
Pentaerythritol	63.50
Paraffin wax	13.75
Rangolite (German)	60.00
Rangolite (Czech.)	42.00
Sodium sulphate (Fine)	4.00
Sodium sulphate (Coarse)	3.80
Sodium sulphide 50-52% (Flakes)	8.25
Sodium sulphide 58-60% (Flakes)	9.25
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite	12.90
Sodium chloride 80% (Spain)	83.00
Sodium chlorite (50% span)	75.00
Santobrite (Indian)	36.00
Soda Ash (Tata)	3.85
Soda Ash (Birla)	3.50
Soda Ash (Imp.)	3.50
Sodium bicarbonate	6.50
Sodium bisulphite	4.50
Sodium silicate	3.00
Sodium acetate	6.40
Sodium alginate	160+ST
Titanium Dioxide (Anatase)	50.00
Titanium Dioxide (Rutile — RCR_2)	68+ST
Tartaric acid (Crystal)	94.00
Trisodium phosphate	4.80
Thiourea	64+ST
Urea (Tech.)	2.60
Vacuum salt	1.00
Zinc Dust	30.00
Zinc Oxide	28.00
Zinc chloride powder (technical)	14.00
Zinc sulphate	4.20

SOLVENTS	Per kg.
Acetic Acid (Glacial)	12.50
Acetic Anhydride	26.00
Acetone	20.50
Adipic Acid	50.00
Aceto Acetanilide	50.00
Aniline Oil	45.00
Benzoate Plasticiser	33.00
Butyl Acetate	42.00
Butyl stearate	36.00
Butyl Acrylate	63+ST
Butanol	44.00
Benzyl chloride	24.00
Benzo trichloride	16.00
Benzoyl chloride	22.00
Benzyl Alcohol (FPC)	36.00
Bromine Liquid	45.00
Chloroform	24.50
Carbon Tetrachloride	10.75
Cyclohexanone	36.25
Cyclohexanol	44.00
Diacetone	30+ST
Diethylene glycol (DEG)	30.00
Dioctyl Phthalate	47.50
Diallyl Phthalate	48.50
Dimethyl Phthalate	28.60
Dioctyl Adipate	52.00
Dibutyl Adipate	42.00
Dipentene	14.00
Dimethylamine 40%	12.00
Dimethylamine 60%	14.00
Ethyl Acetate	24.00
Ethyl Acrylate	46.00
Ethylene Dichloride	11.00
Ethylene Glycol	22.00
Formic Acid (Imp.)	30+ST
Formaldehyde	5.75
Glycerine (CP)	50.00
Glycerine (IW)	49.00
Hydrogen peroxide 50%	25.75
Iso Propyl Alcohol	18.50
Iso Butyl Alcohol	28.00
Monoethanolamine	46.50
Morpholine (Indian)	65.00
Melamine	36.00
Methyl Ethyl Ketone	38.00
Methyl Isobutyl Ketone	34.00
Methyl Acrylate	42.00
Methylene Dichloride	21.50
Meta Cresol	45.00
Nitrobenzene	16.50
Nitric Acid (Con.) (RCF)	2.50
Ortho Cresol	32.00
Phenol	38.00
Propylene Glycol	31.00
Polyethylene Glycol (No. 200)	36.00
Polythylene Glycol (No. 400)	37.00
Polyethylene Glycol (No. 500)	42.00

ETHYL ACETATE
BUTYL ACETATE
ACETIC ANHYDRIDE

DI-OCTYL PHTHALATE (DOP)
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at Company's Competitive Prices Please Contact :

Pigment & Dyestuffs Corporation

8th Floor, Vijay Tower,
Opp. Abad Dairy, Kankaria Road, Ahmedabad-380 022.
Phones : 54156/53977 Resi.: 369083/366310 Gram : "ACETIC"
Bombay Office :
202, Raut Chambers, 2nd Floor,
340/42, Samuel Street, Vadgadi, Bombay-400 003.
Phones : 339384/335182; Resi.: 867887 Grams : "KOTIYARK"

FOR YOUR REQUIREMENTS OF :

ZINC DUST
ZINC CHLORIDE (Powder & Solid)
ZINC OXIDE (Rubber Grade)
ZINC CARBONATE
POLYSOL ★ IRON POWDER

Please Contact :

D. R. S. Corporation

187, Sherif Devji Street, 1st Floor,
R. No. 8, BOMBAY-400 003.
Phones : 333854/333864

For Your Regular Requirements Of :

TRICHLORO ETHYLENE (Original/Tech.)
IPA (Original & Distilled)
METHYLENE CHLORIDE 99%
ORTHO XYLENE
DI ETHYL AMINE (Original)
OXALIC ACID 92% & 98%
TARTARIC ACID (Original/Recovered)
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ACRYLONITRILE (Original)
TRISODIUM PHOSPHATE
PARAFORMALDEHYDE 91%
PROPYLENE GLYCOL (Dow)
ACETONE (Original/Distilled)
D. E. G. (Original/Repack)
M. E. G. (Original/Repack)
OXALIC ACID (Substitute)
SORBITOL
METHANOL (Distilled)
SODIUM NITRATE
GLYOXAL — 40%
MALEIC ANHYDRIDE
TRI ETHYL AMINE
OCTANOL

Please Contact :

BEEKAY ENTERPRISES

M-1, Faiz-E-Qutbi, 375, Narsinatha Street, Bombay-400 009.
Phone : 349080/345011 Resi : 512 1572/512 4452

For Your Requirements Of :

Metronidazole Benzoate I. P.
Chloramphenicol I.P.
Sodium Lauryl Sulphate I. P.
Sodium Lauryl Sulphate 30% Soln.
Benzyl Benzoate I.P.
Propyl Paraben

Contact the Manufacturers :

MANJARATI CHEMICALS

4. Chheda Bhavan, 2nd Floor, 98, Surat Street.
Masjid, Bombay-400 009.
Phones : 341126/348022/330318

Polyethylene Glycol (No. 1500)	44.00
Polyethylene Glycol (No. 4000)	38.00
Polyethylene Glycol (No. 6000)	50.00
Para Cresol	60.00
Styrene Monomer	31.00
Sorbitol	16.25
Trichloroethylene	24.50
Triethanolamine	41.00
Sulphuric Acid	2.10
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	11.75
Triethylamine	50.00
Vinyl Acetate Monomer	38.50

SOLVENTS	Per Litre
Benzene	8.90
N-Heptane	8.00
N-Hexane	8.75
Methanol	6.75
Solvent Naphtha Heavy	9.50
Solvent Naphtha Light	8.50
Toluene	10.30
Xylene	12.00

DYES INTERMEDIATES PRICES ARE WITHOUT TAX & EXCISE	Per Kg.
Alphanaphthylamine	54.00
Aceto Acetic Ester (Methyl)	61.00
Alpha Naphthol (Imp.)	155.00
Ammonium Molybdate	170.00
Anthraquinone	80.00
Anthranilic Acid	63.00
2-Amino-4-Nitrophenol (Imp.)	140.00
Blue B. Base (Local)	235.00
Beta Naphthol (Atul)	58.00
Benzidine Dihydrochloride (BDH)	70.00
Bromamine Acid	400.00
BON Acid	108.00
Chicago Acid	275.00
C. Acid (Imp.)	260.00
Coach Acid	58.00
Cyanuric Chloride (Japan)	126.00
2, 4, DNCB	26.00
Dihydrothio PTOS (Imp.)	500.00
Dimethyl Aniline	53.50
Diethyl Aniline	135.00
Di-amino stilbene disulphonic Acid	115.00
3, 3-DCB (Imp.)	155.00
Gamma Acid (Atul)	160.00
H. Acid (Atul)	150.00
G. Salt	56.00
Isophthalic Acid	39.00
J. Acid	265.00
J. Acid Urea	260.00
K. Acid	95.00
MDPS (German)	210.00
MNA	75.00
Meta Urido Aniline	135.00
MPD (Local)	122.00
MPD (Japan)	150.00
Naphthenic Acid	11.00
N-Methyl J. Acid	395.00
N-Methyl Aniline	140.00
Napthalene crude	13.50
Naphthalene (Refined)	18.00
Ortho Anisidine (OA Imp.)	85.00
Ortho Dichloro Benzene (ODCB)	10.00
OT Base	93.00
Para Dichloro Benzene (PDCB)	15.00
Para Anisidine (PA-Imp.)	110.00
Para Anisidine (PA-Local)	87.00
PNA	66.00
Para Cresidine (Imp.)	325.00
Para Amino Azo Benzene (India)	120.00
PNCB	27.50
Para Amino Acetanilide	140.00
1-Phenyl 3-methyl-5 Pyrazolone	110.00
Phenyl J. Acid	300.00
Para Amino Benzoic Acid	170.00
PT Base	88.00
Rhoduline Acid	425.00
Resorcinol	138.00
Resist Salt	18.00
Sodium-Naphthionate	62.00
5-Sulpho-Anthranilic Acid	60.00
Sulpho Tobias Acid	90.00
Sulphanilic Acid	24.50
Trichloro Benzene (TCB)	15.00
Tobias Acid (Imp.)	105.00

NOW AVAILABLE! ANY QUANTITY, AS AND WHEN REQUIRED BY YOU

MONO-CHLORO ACETIC ACID

When it comes to chemicals, we care a little extra. Making sure to produce chemicals that meet exacting standards of quality, purity and reliability. Backed by research and thorough testing. Our customer service can help you improve your present products and develop new ones. And remember, we can meet your requirement in bulk whenever and wherever you want. why not try ?

We manufacture: N.T.A. • E.D.T.A. & its salt • S.M.C.A. • Sodium Acetate & Hydrochloric Acid.

We market: Acetic Acid • Acetic Anhydride • Butyl & Amyl Alcohol • Ethyl & Butyl Acetate Acetaldehyde • Paraldehyde • D.B.P. • D.E.P.

ashok organic
industries ltd.

Regd Office : 406 Sharada Chambers,
33 New Marine Lines, Bombay 400 020.
Phones: 252236-252258 • Telex: 011-3859
Factory: Nandesari, Dist. Baroda, Phones : 271-273.

AKARJ-AO-8/78

FOR YOUR REQUIREMENTS OF :

NAME	C. I. NUMBER
Acid Rhodamine B	Acid Red 52
Acid Green V	Acid Green 16
Acid Patent Blue AS	Acid Blue 7
Acid Patent Blue VS	Acid Blue 1
Acid Violet 4BS	Acid Violet 49
Acid Coomassi Blue FF	Acid Blue 15
Basic Victoria Blue B	Basic Blue 26
Basic Victoria Blue B BASE	Solvent Blue 4

Full Range of Direct, Reactive, Ramazole

Please Contact Manufacturers for Competitive Rates :

MAHENDRA INDUSTRIES

Manufacturers & Exporters of Dyes, Chemicals & Dye Intermediates

Office : 312, Yogeshwar, 135/137, Kazi Sayed Street, 3rd Floor, Bombay-3.
Phones : 338770/345315, Resi. : 252296
Factory : 5/1/4, G.I.D.C. Phase-I, Vatva, Ahmedabad, Gujarat (India)
Phones : Factory : 393560 Tesi.: 441771/448188

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COPPER SALTS · (Re-introducing)

- COPPER SULPHATE
- COPPER CHROMATE
- COPPER ACETATE
- COPPER NITRATE
- COPPER CARBONATE

MERCURY SALTS :

- MERCURIC CHLORIDE
- MERCURIC OXIDE
- MERCURIC ACETATE
- MERCURIC SULPHATE
- MERCURIC IODIDE
- MERCURIC THIOCYANATE
- MERCURIC NITRATE

LEAD SALTS :

- LEAD ACETATE
- LEAD PEROXIDE
- LEAD NITRATE
- LEAD CHLORIDE
- LEAD PHOSPHATE

TARTARATES :

- SODIUM POTASSIUM TARTARATE
- AMMONIUM TARTARATE
- SODIUM BITARTARATE

&

ALL TYPES OF CHROMATES, PHOSPHATES, STRONTIUM SALTS ETC.

Please Contact Manufacturers For Competitive Prices :

L. S. Chemicals & Pharmaceuticals

10, Kotkar Industrial Estate, Off : Aarey Road,
Goregaon (East), BOMBAY-400 063.
Tel. : Factory : 692391 Resi.: 625735

For Your Requirement Of :

Stable Bleaching Powder

(AVAILABLE CHLORINE 35% TO 38%)

VIKRAM BRAND

Packed in 25 Kgs and 50 Kgs HDPE Bags and 50 Kgs M.S. & G.I. Drums

Contact Manufacturers :

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(FORMERLY GWALIOR RAYON)

91, Sakhar Bhawan, 230, Nariman Point, BOMBAY-400 021.
Phone : 2043454 Telex : 011-4235 GRIR IN

The most reliable source for quality chemicals.

Bombay Dyes Markets

(Prices as on 29th October, 1987)

ACID COLOUR	Per Kg
Acid Violet 4BS	143.00
Acid Maroon V	110.00
Acid Orange II	77.80
Acid Orange IIY	63.05
Acid Red A	107.25
Crosein Scarlet MOG	155.00
Acid Scarlet 3R	99.90
Acid Red 38N	135.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Green V	330.00
Acid Patent Blue AS	250.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	121.95
Acid Black BX	98.40
Acid Black Wax	135.50
Procinil Yellow GS (I.C.I., UK)	265.00
Procinil Red GS (I.C.I., UK)	530.00
Procinil Blue RS (I.C.I., UK)	315.00
Procinil Scarlet G (I.C.I., UK)	800.00
Procinil Orange G (I.C.I., UK)	250.00
Procinil Rubine (I.C.I., UK)	550.00

DIRECT COLOURS	Per Kg
Yellow 3GX	88.10
Sun Yellow RCH	124.40
Fast Yellow GCH	141.15
Yellow CFG Hly. Conc.	312.00
Fast Yellow GS	111.65
Fast Yellow CHRS	95.45
Viscose Orange A	166.15
Fast Orange GR	133.75
Red	96.90
Dark Tan	78.25
Red IIR	72.55
Red 4B	169.10
Bordeaux BW	132.30
Fast Scarlet 4BS	166.55
Red 12B	170.55
Bordeux Hly Conc.	194.00
Cotton Red N	117.05
Brill. Fast Helio B	278.00
Brill. Fast Helio 2B	297.00
Brill. Fast Helio 2RS	136.20
Brill. Fast Helio BS	116.10
Brill. Violet Extra	126.40
Blue 2B	86.60
Blue G	170.50
Sky Blue FB	188.25
Copper Blue GR	147.00
Fast Greenish Blue GL	114.60
Developed Black BT	116.10
Blue NB-2B	300.20
Blue NB-2BC	185.30
Developed Black NB-BH5	185.30
Green B	111.65
Green NB-B	188.25
Green 2B-N	188.25
Brown MR	154.40
Brown CN	107.25
Golden Brown G	140.35
Catechin G	120.50
Omega Tan	126.40
Catechin GS	102.80
Black E Hly Conc.	142.60
Black E Extra Hly Conc.	142.60
Black NB-ER Hly. Conc.	310.50

DISPERSOL COLOURS	Per Kg
Yellow 6G Powder	143.80
Red B 3B Powder	247.80
Red B 2B Powder	323.20
Red CB Powder	439.15
Red D2B Powder	477.40
Violet C 4R	521.90
Blue BG Powder	235.45
Blue BN Powder	103.75
Blue D 2R Powder	476.25
Navy BT Powder	243.90
Blue B 2G Powder	210.20
Black BT Powder	182.60
Blue BR Powder	390.20
Yellow 7GL	338.60
Yellow 5RX	218.80
Yellow 3G	367.25
Yellow	140.00
Yellow AL	135.30
Yellow Brown REL	247.50
Yellow FFL	463.60
Gold Yellow GG	259.70
Pink REL	247.00
Red REL	468.65
Red 2B	327.40
Red FB	324.20
Red Violet FBL	469.85
Orange 3R	196.65
Violet 3R	280.60
Violet 6R	485.75
Violet RL	275.45
Scarlet RR	214.85
Rubine 3B	223.05
Rubine CB	364.90
Blue GL	318.95
Blue BGF	636.55
Navy Blue RE	270.40
Brown 3REL	200.40
Black GEL	324.20
Dark Brown 3B	317.40

BASE COLOURS	Per Kg.
Fast Yellow GC	80.20
Fast Orange GC	135.45
Fast Scarlet R	168.80
Fast Scarlet RC	126.65
Fast Scarlet RCR	99.05
Fast Scarlet G	121.65
Fast Scarlet GN	91.50
Fast Scarlet GG	72.70
Fast Scarlet GGS	72.70
Fast Red B	203.20
Fast Red RC	119.15
Fast Red R Flakes	149.25
Fast Red TR	166.80
Fast Red TR Oil	183.15
Fast Red RL	237.10
Fast Red KB Oil	201.95
Fast Bordeaux GP	201.95
Fast Garnet GBC	94.05
Fast Violet B	505.60
Fast Blue BB	521.45

NAPHTHOL COLOURS	Per Kg
ASG	217.00
AS	143.00
ASSW	279.75
ABBS	188.15
ASBO	195.65
ASD	175.60
ASOL	179.35
ASTR	279.75
ASPH	279.75
ASE	196.05
ASEI	184.40
ASLB	1632.60
ASBT	1817.00
ASWG	143.00
ASSG	397.70
ASSR	480.50

PROCION COLOURS	Per Kg
Golden Yellow HR	181.30
Brill, Yellow H4G	117.85
Supra Yellow H-8GP	168.55
Brill. Yellow HE6G	166.95
Yellow H-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	243.95
Yellow M GR	326.05
Brill. Yellow M 4G	177.10
Brill. Yellow M 8G	332.30
Yellow M 3R	217.60
Brill. Orange H 2R	241.85
Brill. Red H 7B	157.95
Brill. Orange M 2R	313.15
Brill. Red H 8B	169.45
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.30
Brill. Red H-F3B	243.45
Brill. Magenta HB	167.00
Brill. Red M 5B	98.90
Brill. Red M 8B	173.70
Brill. Pink MB	137.10
Brill. Magenta MB	121.55
Brill. Purple H-3R	180.20
Brill. Purple H-7R	175.40
Navy Blue H 3R	298.50
Brill. Blue H-GR	366.55
Brill. Blue H 5G	173.10
Blue H 5R	283.85
Brill. Blue H 7G	178.70
Brill. Blue H 7RX	358.15
Turquoise HA	234.45
Supra Blue H-3RP	335.70
Supra Turquoise H 2GF	181.50
Blue H-ERD	305.80
Navy Blue H ER	258.60
Blue H 5RX	269.30
Navy Blue M 3R	310.95
Brill. Blue MR	331.70
Brill. Blue M RX	214.20
Brill. Blue M-G	382.30
Blue M 4GD	344.60
Navy Blue M RB	318.75
Turquoise M-G	197.85
Brill. Blue M GX	302.50
Blue 3R Acre Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide (per kg.)	285.00
Green H 4BD	269.80
Green H-E4BI	169.80
Red Brown H 1F	143.25
Orange Brown H 28	209.05
Brown M GRN	188.80
Black H-N	283.35

SULFUR COLOURS	Per Kg.
Navy Blue	99.85
Green G	198.55
Black Grains Extra	63.05
Black Grains OG	64.55
Black GXE Conc.	61.60
Black GXE	52.75
Black GXR	61.60
Black Grains 800	54.20
Black EXR Grains	64.55
Black EXR Grains 800	51.25

VAT COLOURS (ICI)	Per Kg.
Yellow 5G Powder Fine	673.15
Yellow 5G Supra Disperse	439.30
Yellow 5G Acra Con.	628.75
Yellow 3R Powder	588.85
Gold Orange 3G Pdr. Fine	952.15
Brill. Orange 6R Pdr. Fine	624.35
Gold Orange 3G Supra Disp.	601.30
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	997.80
Brill. Red 3B Supra Disp.	713.20
Brill. Purple 4R Conc Pdr.	470.75
Brill. Purple 3R Acra Powder	690.85
Brill. Purple 2R Hly Conc.	597.90
Brill. Purple 4R Supra Disp.	500.05
Brill. Purple 2R Acra Conc.	625.95
Blue R Powder Fine	542.15
Blue BC Conc. Pdr. Fine	522.50
Blue BC Acra Conc. Pdr. Fine	762.70
Blue R Conc. Pdr. Fine	577.65
Blue RR Supra Powder	629.35
Blue Conc Powder	645.80
Brill. Blue 2R Hly Conc	378.55
Bril. Blue 2R Supra Disp.	115.65
Dark Blue 2R Powder Fine	389.25
Blue BC Supra Disp.	359.40
Jade Green XBN Powder Fine	438.20
Jade Green XBN Acra Conc. Powder	823.90
Jade Green 2G Pdr. Fine	419.65
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Ptg. Paste	125.40
Olive Green B. Pdr. Fine	399.90
Olive Green B Supra Disp.	[illegible]
Jade Green 2G Supra Disp.	[illegible]
Jade Green XBN Supra Disp. (N)	327.30
Olive D. Pdr. Fine	444.30
Olive OMW Pdr. Fine	698.55
Olive OMW Supra Disp.	538.05
Olive R. Pdr. Fine	422.95
Olive R Supra Disp.	363.90
Olive D Supra Disp.	361.70
Olive D. Ptg. Paste	193.00
Olive Green B. Ptg. Paste	199.10
Olive Green B Acra Conc.	542.75
Olive R Acra Conc.	640.00
Olive Green B Acra Conc	542.75
Brown R Pdr. Fine	835.00
Brown G. Pdr. Fine	795.00
Brown R Pdr. Fine	659.75
Dark Brown 3R Pdr. Fine	685.00
Brown G. Supra Disp.	449.90
Brown 2G Supra Disp.	554.00
Brown R Supra Disp.	422.95
Brown BR Powder	719.00
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	414.55
Brown G Acra Conc.	733.95
Brown R Acra Conc	756.00
Grey M. Powder Fine	768.80
Grey M. Supra Disp.	585.45
Blue BC Acra Conc Pdr. Fine	762.70
Direct Black AC Pdr. Fine	474.70
Direct Black AC Supra Disp.	330.35
Direct Black CH Supra Disp.	393.20
Direct ACD Ptg. Paste	217.15

Delhi Market

DELHI: OCT. 30 (NNS) — A rise of Rs. 400 per flask in mercury provided the main feature of trading in the local chemicals market during past week, says NNS. Tartaric acid also spurted by Rs. 200, while sodium nitrite declined by Rs. 15. Volume of business was improved.

Mercury went up from Rs. 7200 to Rs. 7600 per flask due to acute shortage of stocks as well as higher advices from Bombay where its prices flared up from Rs. 7200 to Rs. 7500/-7600 per flask. Its prices may rise in near future. Its supply rates by MMTC was stated at Rs. 7700 per flask. Industrial demand was also good.

In the absence of imports from France coupled with higher advices from Bombay, tartaric acid flared up by Rs. 200 at Rs. 6500 per 50 kg. thanks to sufficient offtake by consumers, whereas citirc acid ruled quiet at Rs. 2050/-2100.

Menthol flake and bold hardened by Rs. 10 each at Rs. 160 and Rs. 180 per kg. respectively followed by higher advices from the mandis of U.P. and reports about 1 tonne of the commodity despatched for Pakistan. In Pakistan peppermint bold was stated at Rs. 340 per kg.

Rangolite Germany was not available in the market, consequently Sulfolight variety looked up by Rs. 4 at Rs. 42.50 thanks to sustained demand shown by gur khandsari maker. Sodium hydro Kalali also sold higher at Rs. 35, while hydro Tamil Nadu softened by 50 paise in the absence of demand. Damosha hydro hardened from Rs. 32.50 to Rs. 33 per kg.

Soda ash Tata and Birla firmed up by Rs. 2 at Rs. 287: Soda ash NAL quoted higher by Rs. 2 at 272 on tight supply. Caustic soda solid and flakes improved by Rs. 5 each due to good offtake.

Paraffin wax ruled easy at Rs. 580 in the absence of demand. Ammonia bicarb reacted downward by Rs. 2 at Rs. 128 per 25 kg followed by reduced demand by bakeries.

Dyes and colours remained unchanged at their last week level.

(DELHI MARKET RATES AS ON OCTOBER 30, 1987)

Ammonia Bicarb (per 25 kg.)	128.00
Mercury (per fask)	7,600.00
Soda ash (per bag)	272-287.00
Ammonium Chloride (per 50 kg.)	110-180.00
Caustic Soda solid (per 50 kg.)	370.00
Caustic Soda flakes (per 50 kg.)	350.00
Citric acid (per 50 kg.)	2050-2150.00
Stable Bleaching Powder Shriram (per 25 kg.)	90.00
Stable Bleaching Powder KCl (per 25 kg.)	83.00
Stable Bleaching Powder MODI (per 25 kg.)	87.00
Sod. Bicarbonate (per 50 kg.)	250.00
Sod. Hydro Sulphite (per kg.)	30.50-35.00
Rangolite (per kg)	37.50-42.50
Boric acid Technical (per 50 kg.)	980.00
Paraffin wax (per 50 kg.)	580.00
Tartaric acid (per 50 kg)	6,500.00
Borax Granular (per 50 kg.)	520.00
Borax Crystal (per 50 kg.)	540.00
Sodium Nitrite (per 50 kg)	645.00
Sodium Nitrate (per 50 kg.)	400.00
Camphor Thal (per kg.)	98.00
Camphor Powder (per kg.)	89.00
Menthol Bold (per kg.)	180.00
Menthol flakes (per kg)	160.00
Menthol medium (per kg.)	170.00
Glycerine (per kg.)	45-55.00
Sodium Silicate (per quintal)	300.00
Hexamine (per kg.)	26.00
Acetic Acid Glacial (per kg.)	14.50-18.00
Copper Sulphate (per quintal)	1,500-1,800.00
Formic acid (per kg.)	30.00
Formaldehyde (per kg.)	6.00
Hydrogen Peroxide (per kg.)	30.00
Calcium Carbonate (per tonne)	2,500-4,000.00
Acid Slurry Soft (per kg.)	25.00
Acid Slurry Hard (per kg.)	32.00
Phosphoric Acid (per 50 kg.)	810.00
Pot. Nitrate (per quintal)	900-1,200.00
Pot. Permanganate (per 50 kg.)	2,300.00
Sod. Bichromate (per 50 kg.)	1,025-1,125.00
Tri-sod. Phosphate (per 50 kg.)	310-330.00
Titanium Dioxide Anatase (per kg.)	48.00
Titanium RC-822 (per kg)	56.00
Zinc Oxide (per metric tonne)	28,500-32,500.00
Phenol Carbolic Acid (per kg.)	28.00
Carbon Tetrachloride (per kg.)	16.50
Chloroform (per kg.)	26.00
Sodium Sulphate (per m. tonne)	3,000-3,200.00
Naphthalene Balls (per 50 kg.)	1050.00

DYES & COLOUR	Per Kg.
Naphthol AS	150.00
Naphthol ASG	235.00
Naphthol ASBS	200.00
Naphthol ASTR	302.00
Naphthol ASOL	191.00
Naphthol ASBO	208.00

DIRECT DYES	Per Kg.
Black E. Conc.	92-150.00
Diazo Black B.T.	125.00
Green B.	115.00
Blue 2-B	86.00
Sky Blue FB	200.00
Basic Auramine 'O' Conc.	55-100.00
Basic Rhodamine B. 500%	220-300.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
Acid Orange	45-52.00

Madras Markets

Dull conditions continued to persist in the Madras chemical market during the week under review. No major changes in price pattern due to payment problem. Dealers afraid to commit fresh business in the market circle. The volume of transaction was also very restricted.

In the Madras stock market chemicals and fertiliser scrips were fluctuated and irregularly and finished small variations. E.I.D. Parry went upto Rs. 34.50 before it was closing at Rs. 31.50; Oswal Agro group met with profit taking and came down at lower levels. Thirumalai Chemical was the only scrip to note better at Rs. 39 and further indicated buyers at Rs. 39.50 Tamil Nadu Dadha remained steady at Rs. 28; T.A.C. was available at Rs. 11.75; Pentasia Chemical was neglected at Rs. 34; Tamil Nadu Petro remained dull trading at Rs. 15 respectively.

(MADRAS MARKET RATES AS ON OCTOBER 27, 1987)

Aluminium (Ram) DCL (per tonne)	1,700.00
Acetic Acid Glacial (per kg)	15.00
Ammonium Acetate (per kg)	18.00
Ammonium Bicarbonate (per 25 kg)	138.00
Ammonium Chloride India (per quintal)	1,900.00
Ammonium Chloride Spic (per tonne)	1,700.00
Bleaching Powder (per 25 kg)	100.00
Borax Granular (per 50 kg)	1,000.00
Carbolic Acid (per kg)	18.00
Chromic Acid Flakes (per kg)	26.00
Calcium Chloride DCM (per 50 kg)	255.00
Caustic Soda (S) (per 50 kg)	225.00
Caustic Soda Flakes Andhra (per tonne)	360.00
Caustic Soda Flakes Mettur (per tonne)	368.00
Caustic Soda Flakes DCM (per tonne)	365.00
Citric Acid Deshi (per 50 kg)	3,400.00
Cobalt Oxide (per kg)	280.00
Copper Sulphate (Ram) (per 50 kg)	825.00
Cresylic Acid (per kg)	45.00
Formic Acid (per kg)	40.00
Formaldehyde (per kg)	11.00
Hydrosulphite of Soda Ind. (per kg)	35.00
Hydrosulphite of Soda Imp. (per kg)	38.00
Hydrogen Peroxide BASF (per kg)	29.00
Magnesium Carbonate Ind. (per kg)	32.00
Magnesium Chloride Pure (per kg)	28.00
Oxalic Acid (per 50 kg)	900.00
Manganese Sulphate Fert. (per 50 kg)	265.00
Manganese Sulphate Tech.) (per 50 kg)	240.00
Mercury (per 3.45 kg)	9,000.00
Potassium Bichromate (per kg)	19.00
Phosphoric Acid (per kg)	15.00
Stearic Acid (per kg)	18.00
Soda Ash Tata (per 75 kg)	275.00
Soda Ash Birla (per 75 kg)	365.00
Sodium Bichromate (per kg)	155.00
Sodium Bicarbonate Tata (per 50 kg)	165.00
Sodium Bicarbonate Birla (per 50 kg)	175.00
Sodium Cyanide Brigs (per kg)	900.00
Sodium Nitrate (per 50 kg)	390.00
Sodium Oxide (per kg)	1,050.00
Sodium Cyanide GDR (per kg)	50.00
Sodium Nitrite Bags (per 50 kg)	530.00
Sodium Silicate (per 50 kg)	130.00
Sodium Bisulphite Aswin (per 50 kg.)	185.00
Sodium Acetate (per kg)	19 50
Sodium Sulphate Powder (per tonne)	3,265.00
Sodium Sulphide (S) (per tonne)	5,200.00
Toluene (per kg)	25.00
Trisodium Phosphate (per 50 kg)	290.00
Urea Tech (per kg)	185.00
Zinc Oxide (per kg)	30.00
Zinc Chloride (per 50 kg)	500.00
Acetone (per kg)	29.00
Benzene (per kg)	26.00
Carbon Tetrachloride (per 100 kg)	1,500.00
Cellosolve (per kg)	50.00
Chloroform (per kg)	25.00
Diacetone Alcohol (per kg)	29.00
Dibutyl Phthalate (per kg)	33.00
Diethylene Glycol (per kg)	30.00
Sorbitol (per kg)	31.00
Dioctyl Phthalate (per kg)	32.00
Isopropyl Alcohol (per kg)	45.00
Methyl Ethyl Ketone (per kg)	48.00
Nitrobenzene Indian (per kg)	14.00
Trichloroethylene (per kg)	24.00
Triethanolamine (per kg)	42.00
Turpentine OIL (per kg)	8.00
Phenol (per kg)	29.00
Isobutanol (per kg)	22.00
Paraffin Wax (per bag)	700.00
Alkyl Benzene (per kg)	320.00
Pentaerithritol (per kg)	59.00
Glycerine (per kg)	48.00
Phthalic (per kg)	29.00
Hyflosupercell (per kg)	22.00
Copper Oxide (Ram) (per tonne)	1,500.00
Zinc Chloride Solid (per kg)	11.00
Zinc Sulphate (Ram) (per tonne)	4,500.00

MATERIALS IMPORTED

BOMBAY

(From 25.10.87 To 27.10.87)
(Cost of Imported Item is CIF Value)

ALPHA PHENYL HYDROCHLORIDE : From Spain : Dexo Labs. Ltd., Hyderabad, 525 kgs., Rs. 1,89,263.

BLEOMYCIN INJECTION : From Japan : Khandelwal Labs. P. Ltd., Rs. 5,74,523.

BULK DRUGS : From Japan : John Rose Labs., Goa, 10 kgs., Rs. 1,76,630.

CHLORIDE INJECTION: From West Germany : Chandra Bhaga Chem. Rs. 1,26,258.

CLOXACILLIN SODIUM ORAL : From Singapore : Mayo Health Care P. Ltd., 100 kgs., Rs. 1,11,039.

GLYCERYL TRINITRATE LACTOSE : From USA : Sidmak Labs P. Ltd., 297 kgs., Rs. 57,908.

GRISEOFULVIN FINE POWDER : From China : Bombay Tablet Mfg. Co. P. Ltd., 200 kgs., Rs. 1,42,027.

METHYL PIPERAZINE: From Japan : Jebco Pharma P. Ltd., 250 kgs., Rs. 1,83,990.

PENICILLIN : From Singapore: Lyka Labs. Ltd., 1,269 kgs., Rs. 5,42,285.

RANITIDINE HCL : From Spain : Sidmak Labs. P. Ltd., Bulsar, 350 kgs., Rs. 8,67,257; 50 kgs., Rs. 1,23,894.

RIFAMYCIN : From Korea : Jebco Pharma P. Ltd., 500 kgs., Rs. 12,20,812.

MADRAS

(From 1.9-87 To 3.9.87)
(Cost of Imported Item is CIF Value)

AROMATIC CHEMICALS : From France : B. V. Aswathiah & Bros., Bangalore, 500 kgs., Rs. 95,033.

BIOCHEMICAL REAGENTS : From USA : Centre for Cellular & Molecular Biology, Hyderabad, 5 kgs., Rs. 7,841.

CALCIUM CARBIDE : From From Poland : Indian Oxygen Ltd., Calcutta, 1,00,000 kgs., Rs. 3,90,000.

DIACETYL PEROXIDE CARBONATE : From FRG : Dhrangadhra Chemical Works Ltd., 2,000 kgs., Rs. 2,67,204.

GUM BENZOIN : From Indonesia : Bharat Indl. Corpn., Bangalore, 299 kgs., Rs. 19,302.

HIGH DENSITY POLYETHYLENE : From Saudi Arabia : Continental Plastic Inc., 51,450 kgs., Rs. 4,31,796.

LABORATORY CHEMICALS : From USA : Madurai Kamaraj Institute, Madurai, 1 kg., Rs. 3,744; From UK : Govt. Medical Stores Dept., Madras, Rs. 4,257; From USA: Andhra Pradesh State Trading Corpn., Hyderabad, 2 kgs., Rs. 15,588.

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Phones : 2970/2841

LINALOOL : From USA : man Agarbathi Co., Bangalore, 181 kgs., Rs. 15,250.

MAGNESIUM OXIDE POWDER : From USA : Carboline India, Madras, 3 kgs., Rs. 100.

METHYL ETHYL PYRIDINE : From Switzerland : Chemet', 1 kg., Rs. 59.

ORGANIC CHEMICALS: From Netherlands : Hindustan Photo Films Mfg. Co. Ltd., 80 kgs., Rs. 51,866.

PHENOL : From USA : Indian Syntans P. Ltd., 2,000 kgs., Rs. 2,89,819.

RUBBER CHEMICALS: From FRG : Sundaram Inds., Ltd., Madurai, 30 kgs., Rs. 9,640.

SILICON CARBIDE CRUCIBLES : From FRG : Escorts Ltd., Faridabad, 1,170 kgs., Rs. 89,633.

MATERIALS EXPORTED BOMBAY

(From 25.10.87 To 27.10.87)

DRUGS AND PHARMACEUTICALS : To Colombo : Indo-German Alkaloids, 1,000 kgs., Rs. 24,400.

FERROUS SULPHIDE POWDER : To Rotterdam : Vijay Chemical Corpn., 5,000 kgs., Rs. 74,000.

HERBAL PRODUCTS : To Felixstowe : Zandu Pharmaceutical Works, 836 kgs., Rs. 50,600.

SODIUM CITRATE BP : To Colombo : Indo-German Alkaloids, 5,000 kgs., Rs. 10,000.

SODIUM HYDROSULPHITE : To Antwerp : Transpek Industry Ltd., 36,000 kgs., Rs. 4,20,860.

ZINC OXIDE : To Felixstowe: Geotec Consultants, 18 kgs., Rs. 1,94,865.

STURGE CONTRACT FOR COURTAULDS

Courtaulds Engineering has been awarded a contract by Sturge Biochemicals for the detailed engineering, procurement and construction supervision of the recovery section of its new citric acid plant to be built at Selby in North Yorkshire.

Courtaulds Engineering has been working with Sturge since December 1985 to develop the conceptual design of the plant.

The contract forms part of Sturge's £30m investment in new citric acid capability at Selby and its scheduled for completion by January 1989. John Brown is supplying the fermenter.

A DUO DEVELOPS EMI SHIELDS USING SUPERCONDUCTORS

Electro-Kinetic Systems (Tranier, Pa.) is teaming up with a group of Massachusetts Institute of Technology scientists in the joint development of custom superconductor composites for electromagnetic shielding. Such composites have the potential to be more effective at shielding than existing products. In addition, the company recently submitted a proposal for government funding for research on superconductive composites, based on new developments in superconductivity and its proprietary technology in composite and coatings technology.

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Herdillia chemicals to expand

Herdillia Chemicals has received a letter of intent during the year ended June, 1987 for expanded capacities of 2,000 tonnes per annum isophrone, 400 tonnes of meta xylenol and 100 tonnes of trimethyl phenol. This will bring the approved capacities closer to economic size. Government approval of the foreign collaboration agreement for isophorone is expected soon.

The company made significant progress in its the magnetic iron oxide project during the year. The foreign collaboration with Magnox Inc. of the U.S.A has been approved by the government and the final agreement is expected to be signed shortly. A new company Herdillia Oxides & Electronics Ltd. has been formed for the implementation of the project in a backward area of Maharashtra.

Similar progress has been made in respect of the 10,000 tonnes per annum of ethylene rubbers project for which the company holds a letter of intent. Foreign collaboration with Uniroyal Chemical Inc. of the U.S. has been approved by the government and the agreement is expected to be signed shortly. For the implementation of this project it is proposed to form a joint venture with Herdillia and Uniroyal as co-promoters.

J. B. CHEMICALS PAYS MORE

J. B. Chemicals & Pharmaceuticals has stepped up the equity dividend for the year ended June, 1987 to 18 per cent from 17 per cent paid for the previous year. The actual dividend payout is higher at Rs. 54 lakhs against Rs. 37.76 lakhs in the previous year because of pro-rata payment on the increased capital.

Sales have gone up by 16 per cent from Rs. 22.[illegible] 1985-86 to Rs. 26.16 crores in 1986-87 and the gross profit by 62 per cent from Rs. 172.87 lakhs to 281.29 lakhs. After providing Rs. 79.05 lakhs (Rs. 43.41 lakhs) for depreciation, Rs. 32 lakhs (Rs. 27 lakhs) for investment allowance and Rs. 18.50 lakhs (Rs. 9 lakhs) for taxation, there is a net profit of Rs. 61.99 lakhs against Rs. 41.85 lakhs. General reserve gets Rs. 7.50 lakhs (Rs. 3.25 lakhs).

The commercial production of metronidazole at the new plant at Ankleshwar commenced during the year and the total production capacity of manufacturing the same is now increased from 150 tonnes to 300 tonnes. In pursuit of backward integration, the company has commenced the construction and erection work of its glyoxal plant, and expects to start production of glyoxal in the second quarter of 1988.

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- Sodium Phosphate Crystal IP.
- Sodium Phosphate Anhydrous IP.
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- Choline Theophyllinate Oxytriphylline NF/USP.
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- Iron & Manganese Peptone.
- Potassium Acid Citrate IP.
- Potassium Acid Tartrate/Cream of Tartrate IP.
- Sodium Benzoate IP.
- Sodium Citrate IP.
- Sodium Potassium Tartrate IP.
- Tetra Potassium Pyro-Phosphate Crystal IP.

- Choline Chloride IP.
- Choline Bitarte NF.
- Choline Bicarbonate
- Edetate Disodium USP.
- Ferric Pyro Phosphate Soluble/Insoluble.
- Ferric Ammonium Citrate Brown/Green IP.
- Ferric Oxide Red/Brown.
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9. N. Heptane
10. Permanent Yellow GRL-80 Hoechst, German make for Printing ink
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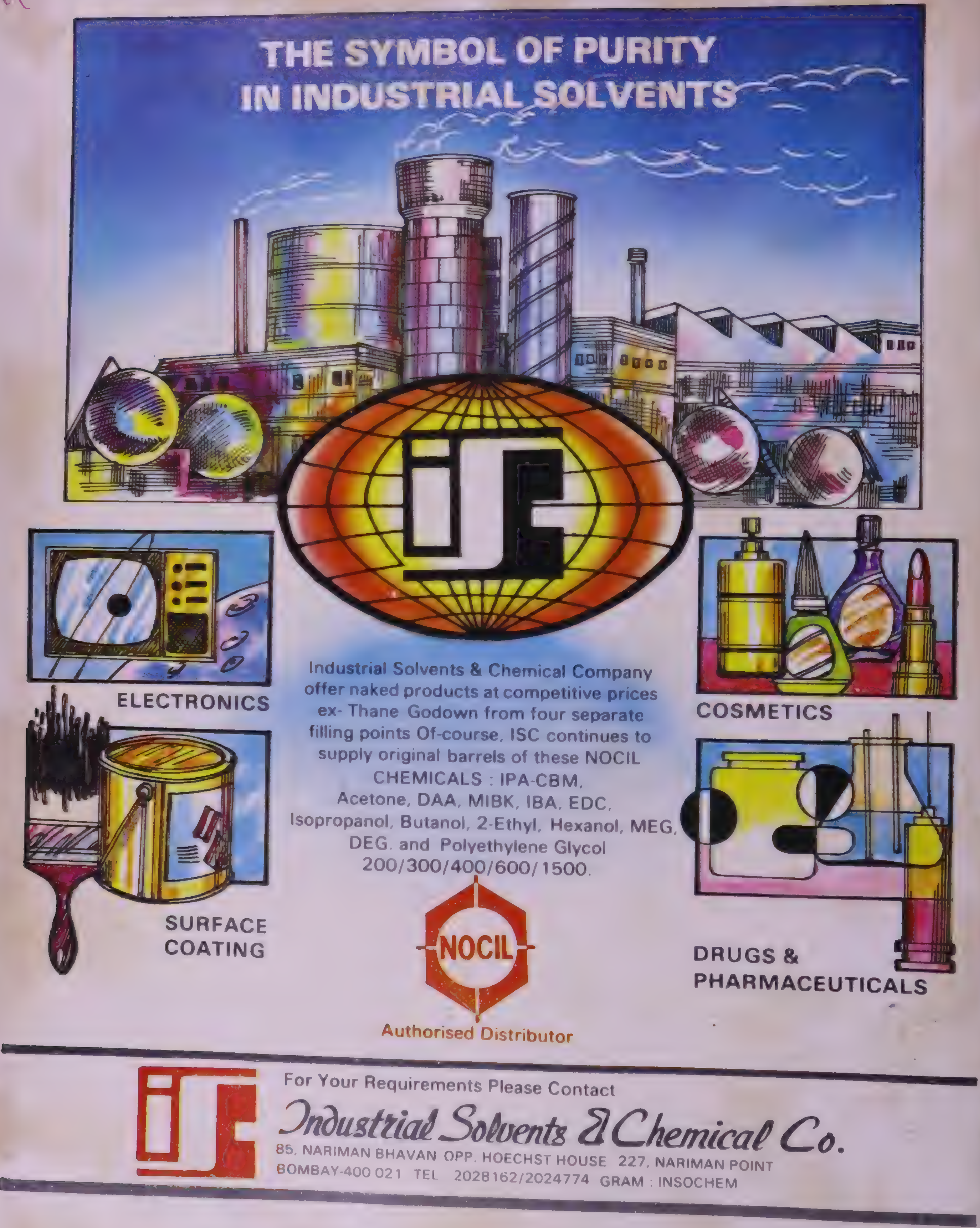

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VOL. XXXIII NOVEMBER 17, 1987 NO.10

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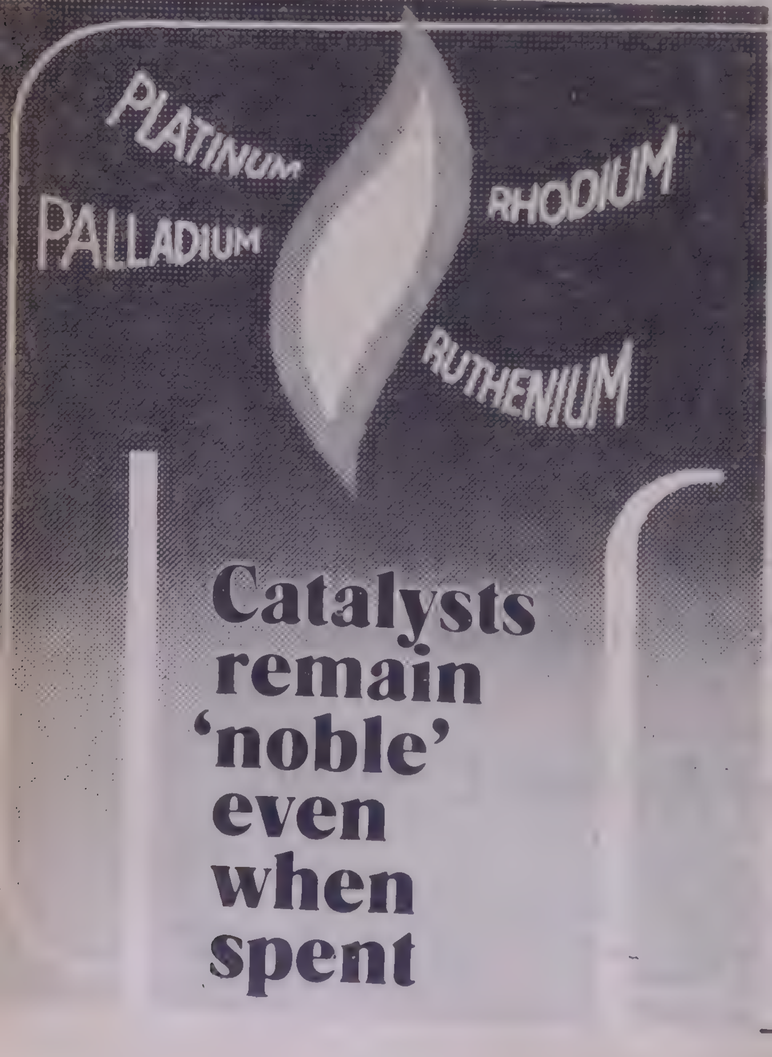

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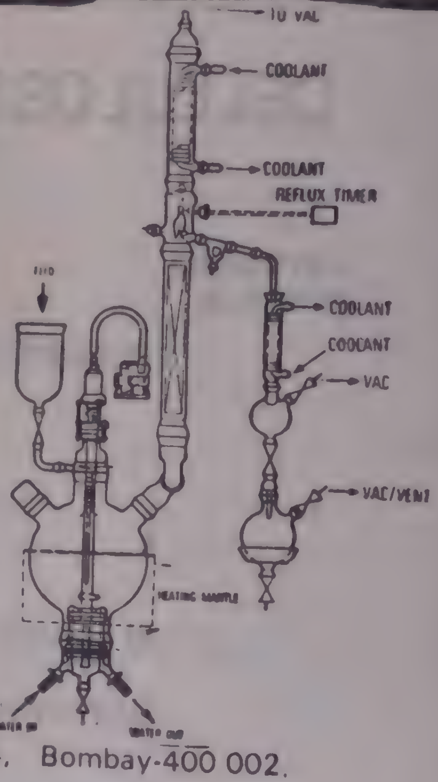

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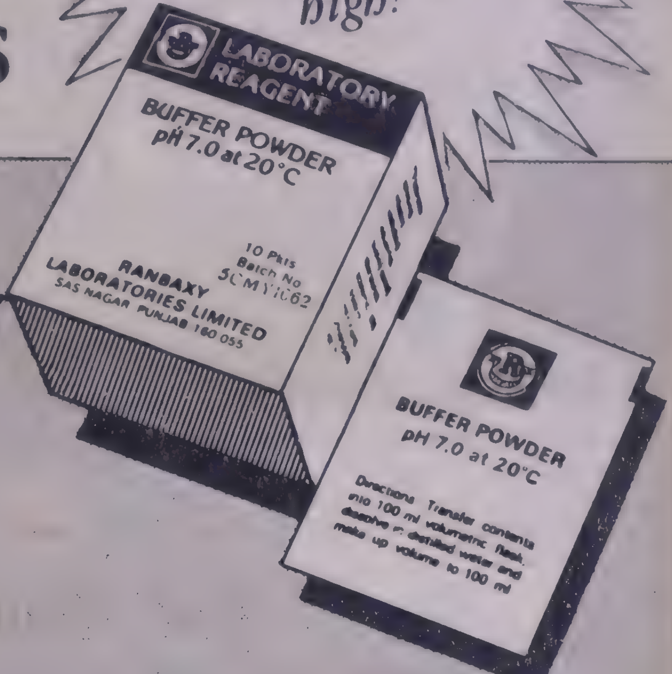
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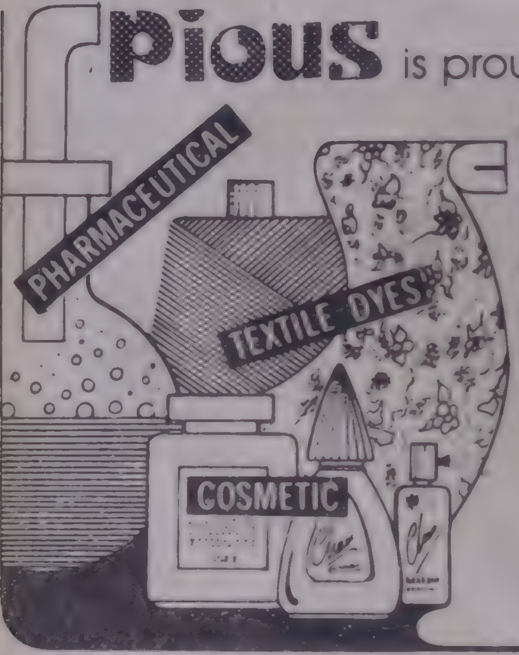

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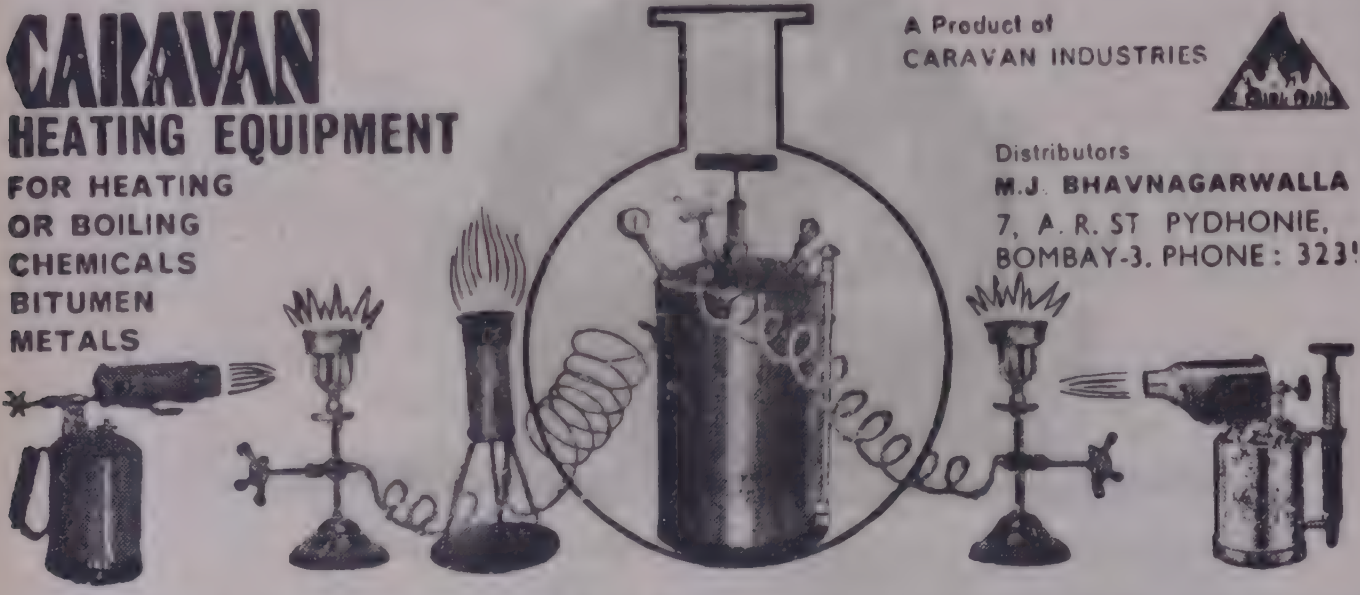

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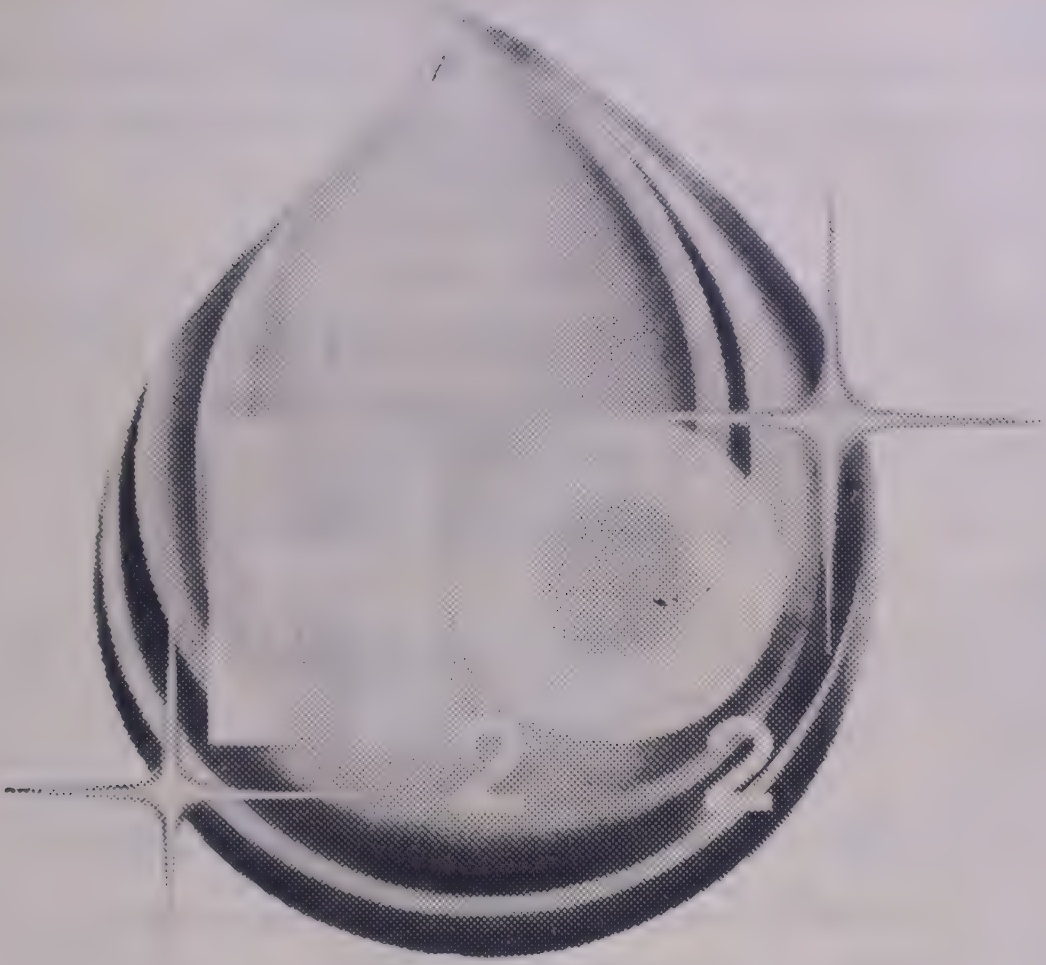

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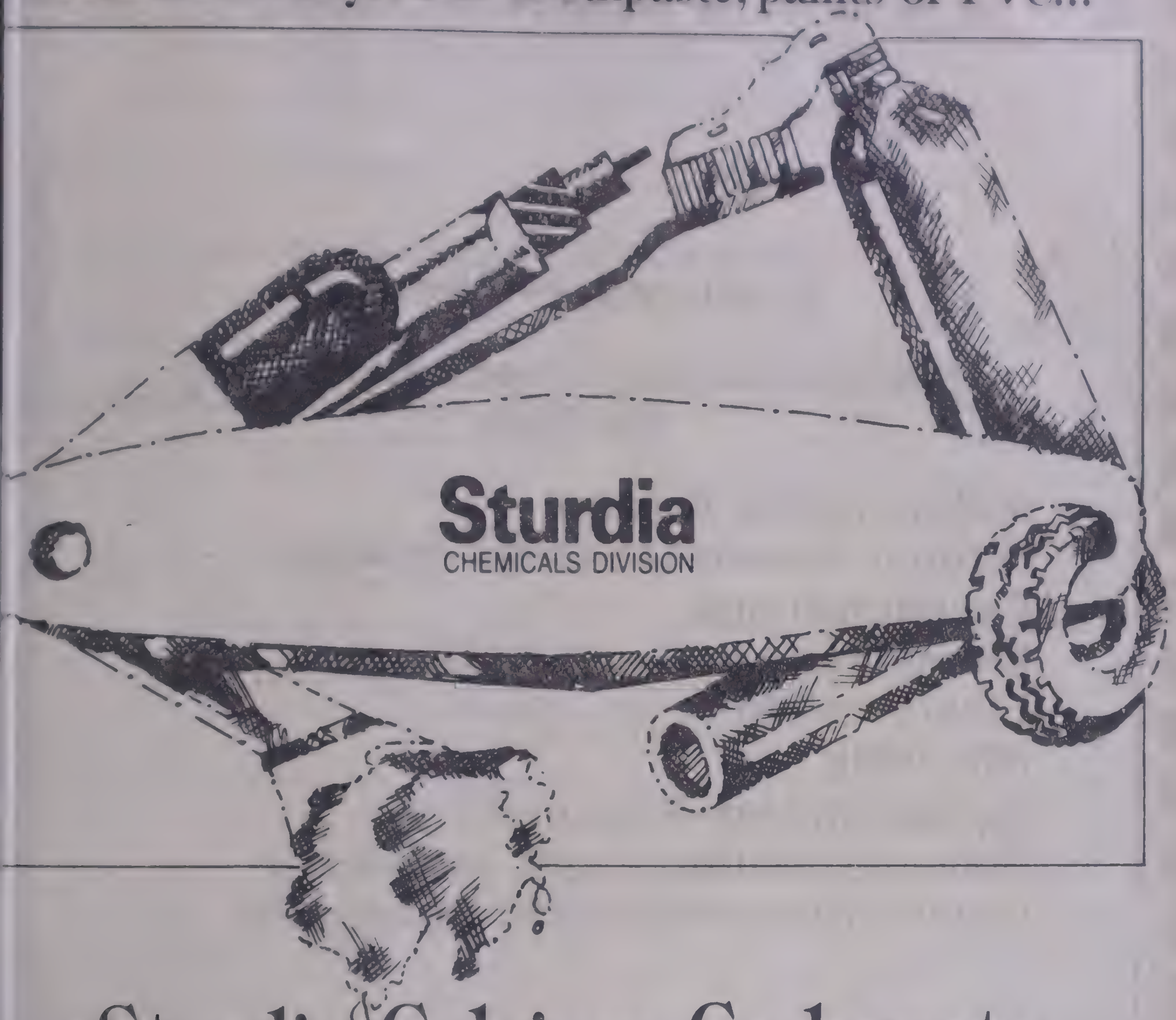

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CHEMICAL
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VOL. XXXIII NOVEMBER 17, 1987 NO. 10

Noble Gases

January 1895, Sir William Ramsay in partnership ith Lord Rayleigh announced to the Royal Society, discovery of new gaseous element, which they called on (Ar), inert or the lazy one, thereby establishing ew group of elements in the periodic table "the noble es".

he discovery solved a mystery which had puzzled entists since 1785, when Henry Cavendish had orted that he could not eliminate a small residue, re than one by one hundred twentyth part of the ole, from any sample of the atmosphere. The resi- was Argon. Helium He, (helios, the Sun) from the me group of elements had first been identified extra estrially in a spectrum recorded during a solar eclipse 868. Ramsay confirmed its existance on earth when obtained a sample of helium by heating clevite, a nium mineral.

Ramsay later went on to isolate Neon (Ne) (new) pton (Kr) (Hidden) and Xenon (Xe) (Stranger) by dis- ng liquified air. The last and heaviest member of the w group -- radon (Rn) was identified from studies on ioactivity. These gases were called noble or inert cause of thier reluctance to combine with other ele- nts. Even today stable compounds of helium, neon d argon are not known. William Ramsay was warded for his discoveries with a Knighthood in 1902, d the Nobel prize for chemistry in 1904. He was pres- nt of the Chemical Society in 1907-08.

This year (1987) celebrates the 25th anniversary of discovery of noble gas chemistry. This discovery pled a belief that had grown for almost seventy years t no member of the family of inert gases could form hermo-dynamically stable chemical compound.

ow, a quarter of a century later, John H. Holloway, n article, in chemistry in Britain (July 1987) looks back he origin, development and more noteworthy recent vances in the field. In March 1962, Bartlett and Lohman (University of British Columbia, Vancouver, Canada) reported the preparation of Xenon Hexa-Fluoro Platinate and expressed the view that this xenon compound was an oxidiser of unprecedented power, capable of oxidising molecular oxygen. Within a month he had confirmed his finding and in June 1962, he published a report of his observation of spontaneous and rapid oxidation of xenon to yield a solid, yellow orange, quinquevalent platinum complex.

No major event in the scientific world is without a controversy. There are reports that more than 60 years ago i.e. in 1924, J.J. Manley had indicated some form of union between Helium and Mercury; soon afterwards E.N. Boomer had in 1925 announced the possible existence of the tungsten helide, WHe, resulting from the sparking of helium in a tungsten filament discharge. There has been no follow up of these two observations while there is today a well established school of researches following up the work of Bartlett.

Bartlett first reported the formation of oxyflouride in a communication entitled "Two new compounds of platinum" but subsequently on detailed rechecking of the analysis, he published a retraction to confirm that it was only a single compound. This remarkable work initiated what was soon to become an entirely new area of chemistry. Before the end of August 1962, Howard Classen, Henry Selig, and John Malin had prepared the first binary fluoride of a noble gas XeF4.

Joseph Slivinik and his coworkers reported the formation of XeF6. Paul Fields, Lawrence Stein and Moshe Zirin reported the first evidence of the existence of radon fluoride. By early 1963, the existence of compounds of Krypton, Xenon and Radon was firmly established.

Time has confirmed the validity of these early observations and that stable compunds are formed only with heavier gases and the only stable compound that can be made are the fluorides. Most compounds that have been obtained consist of noble gas atmos bonded to the most electronegative elements, fluorine and oxygen but species bonded to chlorine, nitrogen and carbon have also been reported. Xenon chemistry is the most extensive; -- Xe is known by oxidation states ranging from +2 to +8 while krypton species are known only in oxidation state +2. Apart from XeF, which has been obtained as an unstable free radical, there is no evidence of the existance of fluorides in odd numbered oxidation states.

Of the 16 known hexa-fluorides xenon hexafluoride has the highest boiling point. This suggests that unlike the other hexafluorides, this compound might be polymeric in the solid state. Although in general, the noble gases form bonds with only the most electronegative elements fluorine and oxygen, the success in making an Xe-N bond in compounds has increased speculation as to whether an Xe-C bond is possible. A plasma induced reaction of XeF_2 vapour with Cf_3 radicals may provide the answer. The volatile waxy white solid product of the reaction, which decomposes to give Xef_2 and carbon fluorides at room temperature is throughout to be $Xe\ (Cf_3)$.

Radon chemistry has assumed increasing importance since it emerged that radon can be oxidised and complexed by certain liquid fluorides and fluoride salts. This offers the possibilities of removing radon from mine atmospheres and of developing radon monitoring devices. The high radio activity of radon has meant that the chemistry of radon has been explored by tracer methods. When micro-curie amounts of radon are heated into fluorine, a difluoride appears to be formed. The same species can be generated spontaneously when millie-curie or larger amounts are mixed with gaseous or liquid fluorine in small volume, the latter reaction is brought about by intense *alpha* radiation.

Krypton chemistry is more limited than that of xenon. Although small amounts of the violet free radical Krf, have been observed no oxide or oxide fluorides have been isolated and early reports on the preparation of Krf_4 have not been confirmed. John Halloway concludes his article on noble gas chemistry (*Chemistry in Britain*, July 1987) with the promise of industrial applications in the next few years. Noble gas chemistry occupies the pride of place in modern lasers - examples - (excimer) lasers depend on the binding of the diatomics RX (R = Argon, Krypton, Xenon; X = fluorine/chlorine) in their excited states. Noble gas chemistry has indeed many commercial applications. Everyone recognises the neon sign and the noble gases are used in a wide variety of fields from sport and photography to medicine, laser technology. Some examples are given below:

1)	Research, weather ballons, airships, geological dating, pressuring rocket fuels and welding	Helium
2)	Lasers and fluorescent or luminescent lights	Neon, Xenon, Krypton
3)	Radioactive tracers	Krypton & Radon
4)	High speed photographic flash lamps	Xenon & Krypton
5)	Superconductors	Helium & Neon

Since helium is unreactive it does not corrode and is used as a cooling medium in Nuclear energy; divers usually breathe a mixture of oxygen and nitrogen. Since helium is less soluble in body fluids than nitrogen using an oxygen helium mixture decreases the risk of the "Bends". The only noticeable effect is a squeaky voice. If neon is used instead of helium the effect is lessened. Argon is used in ordinary light bulbs since it does not react with the metal filament. Krypton is more expensive than argon, issued in flash cubes in photography as is xenon. Radon has been used in radon needles, in cancer treatment. One of the isotopes of krypton K 86 is now used to define the meter, the basic unit of length in the metric system. One meter is 1650763.73 wave length of the orange line in the spectrum of Kr86.

Helium is second only to hydrogen in abundance in the Universe. Hydrogen 76% and helium 23%; meterorites usually contain some helium argon and traces of others. On earth, the gases are trapped in the solid part of the earths crust in igneous rocks. They are gradually released through the action of water and weathering. The gases occur in pockets of natural gas, mine atmospheres, atmosperic gases. The main source of helium is natural gas, the sole industrial source of neon, argon, krypton, and xenon is the atmopshere, radon is the radio active daughter product of radium, which has a half life of less than four days. There would be no radon in the atmosphere, if it were not being continuously produced by radium decay.

Noble gas chemistry is now well established. Still inextricably linked with fluorine chemistry, it has provided a means to accomplish novel fluorinates of introducing new classes of compounds and new high oxidation state species. In the next few years, it promises to take us from the realm of applied chemistry with noble gas fluoride, used as fluorinating agents in industrial processes and radon chemistry being used in areas of monitoring and atmospheric cleansing. Had it not been for Bartlett's astute chemical awareness, we might still be talking of inert gases.

(Source: Chemistry in Britain July-October 1987 & Achievements in Chemistry)

-- T.P.S. RAJAN

CHEMARENA

S.L. VENKITESWARAN

Chromatography as Unit Process

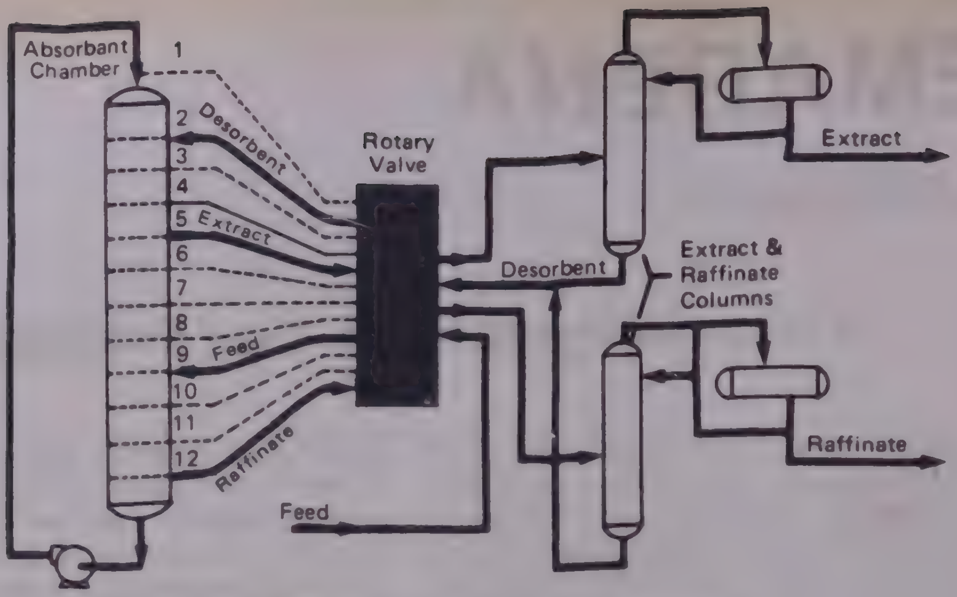
High Performance Liquid Chromatography (HPLC) is moving out of the laboratory into the production plant as a means of separation. Scaling up on HPLC system to purify and handle thousands of kilograms per day of a valuable product is not easy. Research chemists, process chemists and engineers, persons conversant with regulatory schedules, quality control, etc. all are involved in this venture and each group has to make its contribution to make HPLC which was developed as an analytical tool into a commercial process. The product has to be as pure on the large scale as on the laboratory scale. The process has to be speeded up by an order of magnitude. It is particularly useful for high value products and can cut down months of lab work to increase yields in the synthesis and for getting product into the market.

The scale up from the lab scale columns of 10 to 20 mm. dia and 25-50 cm. length to a specifically designed unit to run one single product in large quantities in 2 to 6 inch dia. pipes of 6 ft. or longer is an immense task. However suppliers of components like pumps, columns with unique inlet and outlet configuration, media and sampling systems have sprung up. The industrial chemist is not fully familiar with the concept and issues that are involved in the design and use of HPLC on a large scale and there is little theoretical background. Costs are high and large quantities of special solvents have to be handled with maximum recovery. But a production unit is devoted to one particular specified product and is not a versatile unit for analysis of multiple products. Media regeneration and solvent recycle are specific problems to be solved for a particular product. Use of the designed column at maximum efficiencies under automation is to be ensured. Apart from the pumps to deliver specified quantities of solvents per minute, the uniform flow through a column as wide as 1.2 meters with 1300 kg. of media has to be ensured. The most critical part is the packing of hundreds of kilograms of particles of 30-300 micron pore sizes.

Regulatory issues figure in the case of pharmaceutical products and their purity levels as well as the impurities present. FDA only wants the manufacturer to set all aspects of the production process, procedures, specifications and that these are followed consistently batch to batch and the process is "validated" i.e. provide proper and complete justification for why certain steps are taken together with the records and data. Demonstration of consistency from batch to batch and after regeneration or replacement of media is essential.

The economics and costs are critical. The column media may cost from $200 per kg. for silica to over $1000 for bonded phase packings. A column of 1.2 m. Dia. and 2 m. long with 1300 kg. media may cost from $200,000 to near 5 million. The product has to be of a very high value to bear such costs. The pore size, composition of the silica, surface coverage by the bonded phase change separation efficiencies have to be completely consistent. Anyhow HPLC is stepping out into the separation of high value biotechnology products.

Large scale HPLC systems are in use in the US, Japan and Europe. It is reported that insulin is purified by Eli Lilly using bonded phase packings. It is also reported that trans Vitamin A acetate and 13 cis Vitamin A acetate are beingseparated and that this eliminates many processing steps and saves 30% in the cost. Septech Inc., Wakefield, R.I. have designed a PSLC system for purifying 2000 kg. per day of feed to obtain 1000 kg. of nutritiion supplement for a client. Some of the top names in the pharmaceuticals have such systems in use for purification of fermentation products. In Japan, it is said that an intermediate for pharmaceuticals is extracted from tobacco leaf in a series of 27 columns. But the largest use of PSLC systems is by UOP, Des Plaines, Ill. for xylenes separation as an extension of their "Parex" process for HFCS. It is reported that the Parex process is used to produce 3 mil. tonnes of dry solids in HFCS in what is called simulated moving bed chromatographic process. An outline flow chartof this process is at figure. Precisely timed multiple valves allow feed to be added to specific parts of the column while a similar set of volves are heart-cutting to remove the purified product and undesired



Parex Process: Simulated moving-bed chromatography

functions from other parts of the column which can be the size of grain silos. The filling is said to be a proprietory calcium-magnesium-zinc iron exchange adsorbent that has high selectivity to mono and disaccharides. In this case however the product is of simple composition and there are not any complex impurities unlike with bio-chemicals and proteins. PSLC is also being used for purification of chiral materials, isomers heat sensitive materials, enzymes, flavour and fragrance chemicals. More extensive use can be expected in the wake of the biotechnology developments.

(**Source**: *Industrial Chemist,* Aug. 1987)

Linear Alpha Olefines -- LAO

Linear alpha olefines are olefines at the alpha or 1-position of straight chain hydrocarbons of generally 6 to 18 carbon atoms. Use of LAO's have been growing at over 10 % a year due to the improved processing for their production based on controlled oligomerisation of ethylene. Although originally developed through wax-cracking, they did not make any headway until the advent of the new proprietary processes from ethylene which are used by a very small number of producers -- Chevron, Shell, Ethyl Corporation and Mitsubishi. It is reported that others are likely to join the list with their own versions of the process. The production and use in USA estimated for 1987 and 1990 are as under:

Used For	**1987-1990 (in mil. lbs)**	
Comonomers of LLDPE/HDPE	524	837
Detergents	450	493
Plasticizers	177	192
Lubricants	150	250
Others	155	193
Total	**1456**	**1965**

The key to the success of LAO's in recent years is the demand for the LAO's of lower chain length as comonomers in LLDPE and HDPE. N-Butene-1 has been used in the beginning but Hexene-1 and Octene-1 are being used for a wider range of the polymers and C_6 and C_8 alpha olefines were difficult to get until the newer process from ethylene came along. 4-Methyl pentene-1 (a C_6 comonomer) is made but is not a linear olefine which is claimed to give better polymers. The use of poly alpha olefines in lubricants is a recent development and has notched up a demand for 15,000 tonnes of AOS in Europe. Ethyl Corporation of USA is said to be the largest producer with 57-58% of the US market.

India has been considering a programme for LAO for use in detergents categorised as AOS -- Alpha Olefine Sulphonate. So far no project has taken firm shape except perhaps Godrej's production of these from natural fatty alcohols. Cost is likely to be a serious factor whichever route is adopted for meeting our limited demands but quick decisions for an ethylene based LAO plant are called for.

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MONOPOLY HOUSES' EXPANSION :

Nine projects cleared

The government has approved proposals to set up new undertakings submitted by nine monopoly and dominant houses. These companies include Tata Chemicals, Hindustan Motors, Shaw Wallace, Ambalal Sarabhai, Straw Products of the JK group, and Goodlass Nerolac as well as Vam Organics, Gujarat Alkalies and Sun Polymers of the TVS group.

However, projects of another seven large houses have been rejected after being considered under Section 22 of the MRTP Act. The schemes which have been turned down had been submitted by Arvind Mills, Larsen and Toubro, Mangalore Chemicals and Fertilisers, Modi Alkali and Chemicals Southern Petrochemical Industries, JK Industries and Kesar Enterprises.

The latest official review of applications considered under Section 22 of the MRTP Act, indicates that the government has also allowed several companies to revise project costs and alter earlier stipulations for schemes which were approved previously. These include proposals by Shri Ram Fibres to change the location and revise project costs of its refrigerant gas project and to enable production of spare parts in its outboard motors project.

Among the new ventures which have been approved is the Tata Chemicals proposal for setting up trading and export company. Export activity of the company is proposed to be carried out from different locations such as Mithpur in Gujarat, Bombay, Calcutta and Cochin. It has been stipulated that the company's exports will not be less than 75 per cent of the turnover relating to the trading activity.

Similarly the Shaw Wallace proposal for setting up a unit to manufacture 200 tonnes per annum of acephate (technical) at Haldia in West Bengal has been cleared under the MRTP Act.

A 25 per cent export obligation has also been imposed on Goodlass Nerolac by the government while giving the green signal for a project to manufacture 15,000 tonnes per annum of paints, varnishes and enamels as well as 4,800 tonnes per annum of synthetic resins for captive consumption. The unit which is being set up in Haryana is expected to cater to the requirements of user industries including the automobile industry in northern India.

The proposal of Sun Polymers, of the TVS group, for establishing a unit to make industrial coatings, electrical insulating varnish enamels, resins and potting compounds in Pondicherry has been approved on the grounds that its entry in this sector would create competition and would be in consumers' interests. Since the project is being implemented in A category (backward area) the export obligation has been dispensed with.

The Gujarat Alkalies and Chemicals Limited has been allowed to go ahead with its project for manufacture of potassium hydroxide and potassim carbonate on the condition that adequate steps will be taken to prevent air, soil and water pollution.

Vam Organic Chemicals which is a dominant undertaking in manufacture of vinyl acetate monomers has been accorded approval for 2 separate projects in Uttar Pradesh. One unit is for manufacture of buffered aspirin and the other is for manufacture of petaerythritol and sodium formate.

RIL'S PTA PROJECT APPROVED UNDER MRTP ACT

The minister of state for industrial development Mr. Arunachalam told Rajya Sabha that the PTA project of Reliance Industries has been approved under MRTP Act, 1969, on the basis that sources of finance would be internal cash accruals, debentures, external commercial borrowings and free foreign exchange resources by raising rupee resources.

A substantial expansion of this project under the scheme of minimum economic scale of production has also been approved with sources of finance being issue of equity capital internal generation of funds, unsecured loans subordinate to equity, issue of debentures and loans if any, from financial institutions. Foreign exchange requirements, if any are to be settled to the satisfaction of government, he said in a written reply.

The LAB project of the company has been approved on the basis that sources of finance would be internal resources, foreign exchange loans/deferred payment liabilities, suppliers' credit and debentures.

ACHEMA '88 TO BE HELD IN FRANKFURT

Once again after 3 years ACHEMA '88 biggest international trade fair for Chemical Engineering and Biotechnology will be held in Frankfurt W. Germany from 5-11th June, 1988. More than 2,300 exhibitors will show their latest machines, materials and developments in an area of 1,30,000 sq. mts. ACHEMA '88 will present the best that the chemical industry can offer mainly, established technology, products ready for marketing and innovations. ACHEMA will be the ideal place to do business, to establish contacts and to meet experts from chemical, pharmaceutical, petrochemical, food processing and ceramic industries. More than 2,15,000 international visitors from 78 countries will attend.

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Notice to govt. : Thane pollution

The Bombay high court has ordered the issuance of notices to the Union petroleum ministry, the Maharashtra government and the Maharashtra Pollution Control Board in a writ petition alleging governmental inaction in the face of deteriorating air and water pollution in Thane and the Thane industrial belt.

Three petitioners have sought directions from the court to declare the industrial location policy for zone-III in Thane district as announced by the industry, energy and labour departments of the Maharashtra government as unconstitutional and bad in law.

They wanted the court to order the removal of hazardous industries out of the residential limits of Thane and Thane-Belapur industrial belt and register complaints before an appropriate judicial authority against the companies or individuals in the area for contravening the provisions of the Water Pollution Prevention and Control Act, 1974, and the Air Pollution Prevention and Control Act of 1981.

Further, the petitioners wanted the court to appoint a commission consisting of experts directing them to test the underground and surface, air and rain water, in different parts of Thane and the Thane-Belapur industrial complex and find out their chemical values and calculate the hazards due to the emission of effluents from chemical and petro-chemical plants located in the area.

They urged the court to restrain the state government from granting licences to any industries situated within the Thane and Thane-Belapur industrial complex from expanding their manufacturing limits or allowing chemical or petrochemical units from expanding their business activities or production limits.

The hearing of the petition has been fixed for November 30.

The writ petition was filed by Mr. Datta Kamat and Mr. Prabhakar Anant Sant, two social workers, and Mr. S. L. Belpathak, an advocate, who as workers of the Thane Parisar Paryavaran Wa Nagari Jivan Saurakshan Samiti, described the industrial location policy for zone III comprising the Thane-Belapur industrial complex as unjust and arbitrary.

According to the industrial location policy, new large-scale and small industries and expansion of capacities of existing units shall be permitted in areas earmarked for industries in strict conformity with pollution control measures specified by the Maharashtra Pollution Control Board.

The petitioners submitted that the policy for zone III was contrary to the public interest and the health of its residents. The police, moreover, had failed to differentiate between units manufacturing toxic chemicals and industrial plants using toxic chemicals in their manufacturing process.

They warned that if the large industrial units surveyed by the R. K. Garg committee were not allegedly following rules and regulations preventing pollution, the sanctioning of their expansion plans would not only be hazardous to residents in and around New Bombay but would be dangerous to residents of Bombay city and its suburbs.

Therefore, they contended that it was essential to declare the industrial location policy as formulated for zone III in the government resolution dated February 3, 1984, as unconstitutional and arbitrary and deserved to be quashed.

CONABLE HAPPY WITH IPCL IMPORT PLAN

The World Bank President, Mr. Barber Conable, has emphasised the role of plastics in drought relief and prevention.

Concluding his visit to the Indian Petrochemical Corporation Ltd., at Vadodara, Gujarat, Mr. Conable said that he was very happy to note that "our investment is in good hands." The World Bank's loan of $300 million to IPCL is to provide substantial support to its import plan.

Mr. Conable expressed satisfaction that this aspect of IPCL's programme was proceeding according to schedule so as to ensure timely introduction of new raw materials and distribution of products at uniform and stable prices throughout the country.

Plasticulture has been one of the thrust areas of IPCL during the last few years. The main plastic products used in this area include LDPE films which help control seepage loss in canals and pipes for drip irrigation.

Dr. S. Ganguly, IPCL chairman and managing director, outlined the growth of the Corporation and the dimensions of investment, resource generation and turnover by 1991-92. Its ranking in the corporate sector was now third in terms of dividend payment, fifth according to composite performance and 12th in net profit earned.

It had a successful record of over 90 per cent capacity utilisation in the last four years. The Corporation had successfully absorbed a wide spectrum of complex technologies from various countries.

The Corporation's marketing strategy was aimed at promoting small-scale industries and to offer its products at uniform and stable prices. IPCL had also taken a special initiative in assisting priority sectors such as agriculture, electronics and the first plasticulture development centre in the country was already functioning near the IPCL complex.

Mr. Ganguly said that all IPCL projects involved maximum use of indigenous hardware and had been implemented within time and budget. IPCL aimed at a turnover of Rs. 1500 crores and a production capacity of 725,000 metric tonnes by 1991-92.

During this period, with the going on stream of the Maharashtra Gas Cracker Complex (MGCC) project, IPCL would have acquired a multi-locational and multi-dimensional character. The main growth envisaged in the future would be in the areas of teletronics, engineering plastics and fibre intermediates, Mr. Ganguly said.

CHANGE OF TELEPHONE NUMBER

As of November 14, 1987 the telephone number at CHEMICAL WEEKLY has been changed from 4123436 to 4131198. Readers and advertisers are requested to note the change. CHEMICAL WEEKLY is also available on 4120743, which remains unchanged.

UB Patrochem to expand

Having successfully run the once ailing Hindustan Polymer unit for more than a decade, the United Breweries (UB) has now taken a decision to further expand its operations in the field of petrochemicals.

For a start, two group companies Carew and Phipsons, are presently working on petrochemical projects, for which they have applied for letters of intent.

Since the object clauses of the memorandum of these two companies would have to be amended to enable them to take up these projects, resolutions to this effect would be put forward for shareholders' approval at the forthcoming annual general meetings.

In fact, with several problems plaguing the liquor business, among them the high incidence of sales tax and conservative attitudes of some state governments, United Breweries has, as a matter of policy, decided to expand in areas other than liquor, primarily petrochemicals and electronics, now that MRTP provisions have been relaxed to a great extent. The group already has two electronics units in Bhubaneswar and Bangalore.

Carew and Co is taking up a Rs. 35-crore PMMA/MMA project, which is to come up in a centrally notified backward area of Tamil Nadu to be selected soon.

The capacity of the plant will be of the order of 50,000 tonnes per annum.

The project is to be financed to the extent of Rs. 3.5 crores from internal accruals, Rs. 2.5 crores from suppliers' credit and the remainder through an issue of debentures both convertible and non-convertible.

The product mix has been decided upon presumably because of its increasing demand.

Whereas the demand for PMMA/-MMA in 1989-90 has been estimated at 10,000 tonnes per annum against an installed capacity for these products in the country of only 35,000 tpa at present.

The technical knowhow is yet to be decided and negotiations with several foreign firms are in progress.

Once this project comes through, Carew plans to take up manufacture of equipment for electro-communications and offshore drilling and also produce a range of basic chemicals.

The Phipsons project envisages production of 10,000 tpa of aliphatic Petroleum resin, the letter of intent for which was submitted only last month. This project too is to come up in a backward area of Raigad district in Maharashtra.

The investment involved would be in the region of Rs. 20 crores, of which Rs. 3.25 crores would be realised from internal accruals and Rs 16.75 crores from an increase of convertible and non-convertible debentures. The technology tie-up is yet to be finalised.

At full capacity utilisation, the turnover has been placed at Rs. 16.75 crores.

This is the first time that Phipsons, which is a trading company, is putting up a manufacturing unit.

Taking advantage of MRTP relaxations, the company plans to diversify its activities and to venture into many other areas.

The object clause is to be suitably amended to enable it to deal in drugs and pharmaceuticals, petro chemicals, industrial products, cosmetic toilet perparations, surgical appliances, scientific apparatus and all items under the electronics industry.

During financial year 1986-87, Carew, which has two manufacturing units, in Asansol and Shahjahanpur, and also trades in liquor has performed well and issued an increased dividend of 12 per cent against 10 per cent in the earlier year. This in spite of the fact that its Asansol unit is incurring losses to the tune of Rs. 4 to 5 crores per month and operating at a very low level of 20 to 25 per cent capacity utilisation.

Practically all the profits of the Shahjahanpur unit are being eaten up by the Asansol unit. Carew might we close down this unit if the West Bengal government does not allow it to export the potable alcohol to other states.

Phipsons too has recorded an improvement in the last financial year and has earned a post tax profit of Rs. 1.25 crores.

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Seminar on GAF specialities

M/s. Anshul Agencies, Bombay in collaboration with GAF Corpn., USA is organising a four-day technical seminar on "Polymers, Petroleum, Pharmaceuticals and Cosmetics" at Bombay from 16th Nov. to 19th Nov. The following is a brief note on GAF and the seminar programme :

GAF Corporation, Wayne, New Jersey, USA is a leading manufacturer of speciality chemicals, building materials and filter products. The company has 4,000 employees and is represented in 72 countries around the world. Its main chemical manufacturing facilities are situated at Linden, New Jersey; Calvert City, Kentucky; Texas City, Texas; Seadriit, Texas.

In addition it has an affiliated company GAF Huels Chemie GmbH, West Germany having chemical manufacturing facilities at Marl, West Germany. Within the chemical industry, GAF is best known for its range of high quality acetylene derivatives consisting of some 60 different products used in almost every major industry, complemented by one of the most comprehensive range of surfactants available in the world. In Europe, GAF is also known as a leader in the field of micron rated filtration and offers an extensive range of pressure filter media. These filter products are produced in Belgium and West Germany.

The chemical division of GAF can trace its origins as far back as 1868 with the Albany Aniline and Chemical Company. That company became Hudson River Aniline and Colour Works in 1882.

In 1929 the name was changed to General Aniline Works, and then in 1939 to General Aniline and Film Corporation, finally to GAF Corporation in 1968. In Europe GAF has a close network of wholly owned subsidiaries and attributes much of its success to its ability to respond to the individual and specialised needs of the varying markets. The company prides itself on a highly skilled, technically orientated sales team, responsive to the requirements of its customers and capable of advising on the optimum use of its product range. It is flexible in its business approach and forward thinking in its attitude to regulatory affairs.

In India, GAF Corporation and its subsidiaries are represented by Anshul Agencies, Bombay. Anshul is already supplying a wide range of GAF Products to many leading local companies in the Pharmaceutical, Agrochemical, Metal Treatment and Polymer Industries. Anshul is representing GAF for over a decade and has brought sales of GAF Products from negligible sales to a significant level as of now. Anshul considers its emphasis on customer service being the key factor behind its success in developing market for GAF Products in India. The growing demand for household and industrial products in an emerging competitive environment is likely to generate demand for sophisticated speciality products. For example; the cosmetic market in USA/Europe is one of the major users of GAF Speciality surfactants and polymers for Hairspray & Mousses, Shampoos and Gels whereas the Indian cosmetic market is in the threshold of launching sophisticated products like Hairsprays, Mousses etc. To capitalise the local market potential, GAF and Anshul have planned series of technical seminar on GAF Specialities to focus on the application areas at various centres. Initially, a technical seminar for four days starting from November 16th to 19th is organised in Bombay at Oberoi Hotel. Three senior managers from the technical management and export sales division of GAF Corporation will be discussing the topics relating to technology, application and market trends during the seminar. During the four days seminar, industry-wise topics will be covered. The seminar is expected to provide an unique opportunity to solve applications related problems and will generate ideas for new product/market development. The seminar itinery is :

Date	Focus on
16th November 1987	Polymer, Coatings, Adhesives & Printing Ink Inds.
17th November 1987	Petroleum, Gas, Oil & Metal Treatment Industries.
18th November 1987	Pharmaceutical Industries.
19th November 1987	Cosmetics Industry.

SEMINAR ON "HIGH PERFORMANCE SURFACE COATINGS AND PRINTING INKS FOR PLASTICS" SATURDAY 16TH JANUARY, 1988

The Colour Society is planning a full day seminar on "High performance surface coatings and printing inks for plastics" on Saturday the 16th January, 1988 at Taj Mahal Hotel, Bombay.

The Seminar will include invited lectures by eminent Scientists and Technologists and also presentation of original review papers. The following topics are being covered. 1. Coatings for industrial structures, 2. Tank and pipe coatings, 3. Heat resistant paints 4. Coatings for silos/flooring and effluent tanks, 5. Surface preparation for high performance coatings, 6. Flexographic and gravure inks for plastics, 7. Plastic substrates for printing.

Original/review papers on the topics to be covered are invited for presentation at the seminar. Persons intending to present papers are requested to send extended abstracts of about 400 words in duplicate by 15th November, 1987. Abstracts shall be accepted for presentation after scrutiny, depending on time available and the relevance of subject on the theme of the seminar. Full text of papers can be submitted by 15th December, 1987 for publication in the Journal of Colour Society.

Registration of Delegates :

The registration charge for delegates attending seminar will be Rs. 125 per delegate for members already on the Colour Society and Rs. 200 per delegate for non-members. More details can be had from : Colour Society, C/o Dr. A. V. Pradhan, PPV Section, Dept. of Chemical Technology, N. M. Parekh Marg, Matunga, Bombay-400 019.

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NEWS IN BRIEF

NEW GAS ANALYSIS DEVICE

A new type of gas analysis device based on the principle of the mass spectrometer has been invented in Austria.

The portable unit is capable of analysing gas compounds which have hitherto proved difficult to analyse — like compounds containing ammonia, dioxin or metals — and it carries out the analysis within a matter of seconds. The device contains a high-vacuum chamber in which the gas is bombarded with ions and broken down into molecules.

These are then counted by an integrated particle counter. This generates electrical impulses which are transmitted to a data processing unit, where they are analysed. The results are displayed on a monitor.

The new device is intended primarily for use in environmental measurements and in engine design. It costs approximately half as much as comparable equipment currently available on the market. — News from Austria

SUBSTITUTE FOR NITROGEN FERTILIZER

Research conducted at the Central Plantation Crops Research Institute (CPCRI), Kasaragod, has shown that asymbiotic and associative nitrogen fixing organisms can be made to substitute the nitrogen fertilizer in coconut gardens to the extent of about 50 kg. nitrogen a hectare. Associative nitrogen-fixers such as Azospirillum lipsoferum, Azospirillum brasilense and others have found to be associated with roots of plantation crops. The asymbiotic nitrogen-fixers were also more in the coconut-grass-animal combination as against coconut monocropping system.

HORIZONTAL DRILLING FOR SMALL OIL DEPOSITS

The world's first horizontal drilling to extract oil from the dense chalk has been completed successfully in the Danish zone of the North Sea by the drilling rig "Maersk Guardian" for DUC (Dansk Undergrounds Consortium).

Normally, a production well is drilled vertically or at a slight angle to reach the oil-bearing layers. To cover a larger area, more wells are made. The Maersk Guardian was used to drill at an angle to a depth of 2,000 metres, and then continue horizontally along the oil-bearing structure for about 300 metres.

The resulting production well was the first fully-lined horizontal well in such a hard material, and the chalk layer was shattered to improve permeability by directional explosive charges placed along the horizontal section, after which the fissures created by the explosives charges were plugged with sand.

Initial results have shown a yield of about 4,500 barrels per day, or three times the flow achieved by conventional vertical production wells in the same structure. The method is expected to provide a more economical method of tapping the many relatively small oil deposits in the Danish section of the North Sea.

SUPERCONDUCTING SWITCHES

Superconducting switches are making it into the real world.

The **New Scientist** informs that the first commercial instrument — an oscilloscope — takes advantage of the extremely high speeds of superconducting switches known as Josephson junctions. These electronic switches have enabled development of a new system for examining ultrafast events such as the switching time in electronic components.

The "rise time" of the signal — the time it takes to rise from zero in the instrument — is just five picoseconds (million millionths of a second). The rise time is important because no instrument can record an event if it is shorter than the time it takes to record it.

The new instrument relies on Josephson Junctions operating at the relatively low temperature of 4°K, cooled by liquid helium.

A novel cooling system sprays liquid helium on the corner of the chip that at most needs cooling, rather than immersing the whole chip in liquefied gas. This makes the technology more practical, but the instrument is massive.

FIRE-RETARDANT MATERIALS FOR CABLE INSULATION

Electric cables in high rise buildings, theatres, factories and power plants pose a fire hazard. They are not only sources of fire, but can also act as a medium of fire propagation.

Cable insulation materials like thermoplastic PVC or elastomeric halogen-containing materials like polychloroprene rubber (CR/PCP) or chlorosulphonated polyethylene (CSM/CSP) are commonly used to limit spreading of fire but halogenated materials release acidic corrosive gases and large volumes of thick, black smoke, which hinder fire-fighting and rescue operations.

PVC, CSP and PCP give out hydrogen chloride on burning. Fine particles of calcium carbonate are sometimes added to the PVC to neutralise the hydrogen chloride, but this also reduces the flame retardancy. All the same, these are considered standard materials for oversheaths in giving protetcion during normal use.

In addition, high temperature-resistant barrier tapes, metal tapes and armour are used to conduct heat away from the fire source. When a large number of cables are used in a bunch, the beddings and insulation as well as the oversheaths are made of fire retardants.

Smoke and toxic gases are reduced through the addition of alumina trihydrate to EPR or EVA or ethylene acrylic beddings and oversheaths. Nitrile rubber, blended with some material other than PVC which has flame retarding properties, makes a good halogen-free material for outer jackets. It has good resistance to oil also. One area which many companies are focussing on is achieving toughness and oil resistance properties in fire retarding cables.

COKING COAL CONSUMPTION:

SAIL plants demand may come down

The consumption of coking coal by steel plants of Steel Authority of India (SAIL) for the current financial year (1987-88) may be substantially less than its projected demand of 18.49 million tonnes. This is apprehended by sources in Coal India Limited (CIL).

The sources point out that they are apprehensive because the trend of offtake of coking coal from CIL between April and September was much less than what it was originally projected by SAIL. However, the availability of coking coal from CIL during the current financial year will be about 11 million tonnes with an average ash content of 19.2 per cent.

They further claim that the demand projection of coking coal made by SAIL for the current financial year is very much on the high side, compared to its demand projection of 14.97 million tonnes in 1987-88 and 14.87 million tonnes in 1986-87. In 1986-87 itself, SAIL-steel plant's total consumption was less by 1.3 million tonnes from that of its projected demand of 14.87 million tonnes.

What makes the CIL-sources concerned is that if the offtake by SAIL steal plants does not improve, at least of indigenous coal, Coal India will have to carry a substantial inventory of coking coal. They point out, as per its production programme, CIL is trying to achieve its coking coal production target of about 11 million tonnes during the current financial year.

Although its first priority will be to achieve the production target, CIL has already taken steps to reduce the ash content in its coking coal by modernising and renovating its existing washeries.

It is claimed that CIL is now producing prime coking coal with 20.5 per cent ash content, medium coking coal with 18.2 per cent ash content and blendable coking coal with 17 per cent ash content. The average ash content of its saleable coking coal to SAIL-steel plants is between 19.1 per cent and 19.2 per cent, against its commitment of 19.9 per cent ash content.

Meanwhile, CIL was able to improve its coal production during October also. The total production during April to October this year touched at 784.01 lakh tonnes as against 711.81 lakh tonnes during the corresponding period last year, showing a growth rate of 10.1 per cent or 72.2 lakh tonnes in absolute terms. The 7-month production of washed coal, during the period under review, was 46.65 lakh tonnes as against 44.04 lakh tonnes during the corresponding period last year.

According to a CIL-press release, despatches also showed a marked improvement, being 828.28 lakh tonnes during April to October, 1987, against 754.39 lakh tonnes during the corresponding period last year. The removal of overburden peaked to a new high of 1097.65 lakh cubic metres from April to October as against 898.58 lakh cubic metres.

NFL ACHIEVES 17 PC GROWTH

The public sector National Fertilisers Limited (NFL) has registered a 17.3 per cent growth in production during the first seven months of the current year compared to the corresponding period last year.

The total production of nitrogenous fertiliser upto last month-end was 3,38,275 tonnes as against 2,88,395 tonnes in the corresponding period last year, accordng to a NFL press release.

The Bhatinda unit of the NFL showed an increase of 25 per cent over the same period last year, by turning out 1,00,571 tonnes of nitrogenous fertilisers in the same period.

The Panipat unit produced 1,27,140 tonnes of fertilisers to register a 16.5 per cent increase.

In fact the production at Bhatinda and Panipat units during these seven months is the best ever, the release said.

The Panipat unit also set a monthly production record of 22,207 tonnes of nitrogenous fertilisers during August, utilising 113.2 per cent of its monthly rated capacity.

Similarly, production of 26,262 tonnes of ammonia from Nangal expansion plant during August is also an all time high for any month so far, the press release added.

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21 Coal projects for govt. approval

Twenty-one coal mining projects have so far been received from Coal India Ltd and Singareni collieries for government approval, minister of energy Vasant Sathe said in the Rajya Sabha.

The status of these projects is : Nigahi opencast project (NCL) has been cleared by the Project Approval Board (PAB). Environment and forest clearances have also been received.

Anantha opencast project (SECL) has also been cleared by PIB. In this case as well, environment and forest clearance has been received.

Laudoha underground (ECL) project has been approved by PIB, environment clearance has also been received.

Ramagundam opencast project-III (SCCL) has been cleared by the Inter-ministerial group (IMG). Forest and environment clearances are being awaited.

Manuguru opencast project-III (SCCL) has also been cleared by IMG. But clearance from environment and forest is being awaited.

Pipawar opencast project (CCL) has also been approved by IMG. But forest and environment clearances are awaited.

Ningah underground project (ECL) has been approved by IMG. But environment management plan is yet to be submitted by Coal India Ltd (CIL)

Samleshwari opencast project (SECL) has also been approved by IMG. But forest and environment clearance is awaited.

Ravindra Khani new tech (SCCL) project has also been cleared by IMG. Environment clearance is yet to come.

Kottadih opencast project (ECL) has received environment clearance. This will be again discussed by IMG along with Ottadih underground project.

Mukunda opencast project (BCCL) : In this case, additional information has been called for by IMG.

Six projects — Alinga opencast project (SECL), Gourangdih opencast project (ECL), Dugga opencast project (SECL), Jambad opencast project (ECL), Bakulia underground project (ECL) and Chinnur 1 and 1A inclines project (ICCL) have been recently received. These are under appraisal. These will be taken up for IMG discussions only after environment management plans have been received.

K. D. Hesalong (expansion) project (CCL) was once discussed by IMG. The project report had to be revised. The revised proposal has recently been received. It will be taken up after forestry and environment clearance has been received, the House was informed.

In the case Longwall project goleti (SCCL), environment management plan is still to come.

30 ILs, 44 LIs ISSUED DURING AUGUST

Of the thirty licences issued in the month of August eleven were for setting up new undertakings, nine for manufacturing new articles, six for effecting expansion, three for carrying on business and one for both manufacturing a new article and effecting expansion.

Industrywise twelve of the licences were for metallurgical industries, five for electrical equipment, three each for transportation and chemicals, two for telecommunications two and one each for industrial machinery, office equipment, industrial instrument drugs, foodprocessing industries one each.

Industrywise, 13, of the letters of intent were for chemical industry, eight for electrical equipment, six for metallurgical industries, four for textiles, three for food processing, two each for telecommunication and miscellaneous mechanical and engineering industries, and one each for office equipment, machine tools, medical and surgical appliances, paper, leather, and miscellaneous industries.

Of the 44 letters of intent, 31 were for setting up new undertakings, eleven for manufacturing new articles and two for effecting expansion.

During the month six licences were revoked and one was cancelled. While four letters of intent were revoked, and ten cancelled, three other lapsed.

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GLOBAL MEET ON METALS :

Call for steps to fight corrosion

Dr. V. S. Arunachalam, scientific advisor to the defence ministry called for building up a suitable technological structure and appropriate methods at the national level to combat corrosion of metals.

He was addressing the 10th international congress on metallic corrosion organised by the Central Electrochemical Research Institute (CECRI) of the Council for Scientific and Industrial Research (CSIR). Hundreds of delegates, including 168 from 35 countries, are attending the five-day congress.

Dr. Arunachalam stated that corrosion in cities like Madras abound with humidity, high temperature and other phenomenon, contributing to corrosion.

He stated that "Understanding the phenomenon of corrosion" itself was a major step towards solving the problem and urged the scientific community to act in that direction.

Dr. A. P. Mitra, director general CSIR stated that corrosion was one of the many thrust area programmes identified by his organisation and the CSIR had fixed targets under this programme. One of them was to study bridges in an integrated manner, corrosion of structures, atmospheric corrosion etc., on behalf of the department of transport.

According to him, India's annual expenditure on corrosion was around Rs. 8,000 crores — three times the total investment on research and development in the country and three per cent of the GNP.

Prof. K. I. Vasu, chairman of the institute and organising committee stated that CECRI had built up considerable expertise in a variety of areas and it was the only R and D organisation in the whole world to come forward with turn-key technology offers for setting up electrochemical industries anywhere in the globe, based on 10 proven technologies perfected by it.

It has, to its credit, several original contributions in areas like titanium substrate insoluble anodes for chlor-alkali, chlorate production, electrochlorination, cathodic protection etc.,

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INDUSTRIES :

GROWTH-ORIENTED POLICY VITAL

A growth-oriented industrial policy, with the major stimulus coming from technological improvements, was stressed by Mr. Abid Hussain, Planning Commission Member, in Hyderabad on November 7th.

Mr. Hussain was delivering the Dr. Hussain Zaheer Memorial lecture on industrial policy and technological innovations at the Regional Research Laboratory in Hyderabad.

Pointing out that no simplified solutions were available to face the challenges, Mr. Hussain stated that "an industrial policy should be part of an industrial plan" and the Government needed to work closely on a long-term basis with select private and public sector undertakings, for formulating and implementing corporate plans.

Underscoring the importance of internal competition that held the thrust to innovation, he said that the restructuring of industry would take atleast five more years.

Government should distinguish industry-wide structural problems from purely firm level problems during this phase. Special mechanisms like creation of unemployment insurance system and encouragement for mergers and takeovers was needed, Mr. Hussain said.

Referring to State intervention as a must, he said, that this should be "quantitatively less but qualitatively superior". He, however, pleaded for a "co-operative business-State alliance" to address itself to the industrial problems. On this context, Mr. Hussain drew comparison of the famed MITI in Japan with DGTD and pointed out that institutions created operated only at sub-critical levels.

Firms should be allowed to generate resources continually for ploughing back into technological development and the credit policy should be used more aggressively to promote high-risk strategies at the firm level, he pointed out.

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Corrosion resistant GRP pipes to be launched

Corrosion-resistant pipes made of glass fibre reinforced plastic (GRP), one-fifth the weight of steel, will be produced in the country by mid-1988

GRP is a homogeneous composite of glass fibre, corrosion-resistant polyester resin and inorganic fillers, and is the state-of-the-art technology in the field. The material is low density, virtually inert and has high tensile strength value, which responds in a predetermined manner to loads imposed on the pipe.

GRP pipes of up to 3,000 mm. diameters will be manufactured by Graphite Vicarb India Ltd., at the MIDC Ambad Industrial Estate at Nasik in collaboration with Veroc Technology A/S, Norway, a subsidiary of Owens-Corning Fibreglass Corporation, USA.

According to Mr. Prem C. Lakhotia, Executive Vice-President of the company, GRP pipes are ideal for water supply (intake and transmission pipelines, distribution mains and irrigation) and sewerage (pumping mains and gravity, outfall and culvert pipelines).

Other applications include hydropower and industrial process pipelines, desalination and effluent treatment plants, according to Mr. Bob Morrison of Owens Corning Fibreglass Corpora-ion, who met representatives of the user industries in Bombay recently.

GRP pipes are used in West Asia, Korea and Malaysia besides Europe and America. In Gulf countries, where he company has subsidiaries, GRP pipes are extensively used for desalination, recycling and sewerage, Mr. Morrison said.

The major advantage of such pipes s that they are immune to corrosion. They do not deteriorate from contact with salt water, acid ground water or bacteria. No cathodic protection is required and internal or external coat-ngs are not formed.

The smooth inner surface contribu-es to reduced risk of slime deposits nd blockage and consequent saving of umping and operational costs. The ght weight (one-fifth of steel and ne-tenth of concrete) makes for easy ansportation and installation. Also, hese pipes require fewer joints and re temperature-resistant and unaffect-d by UV radiation.

Mr. Morrison described long-term ts in terms of pumping costs, emergency repairs, infiltration and exfiltration costs, rehabilitation and replacement costs and routine maintenance costs and claimed that GRP enjoyed a distinct advantage over conventional materials under each head. According to him, during the year 1960-61 alone, India spent $320 million for repairs caused by corrosion.

Though new to India, GRP pipes have been progressively replacing conventional pipes made of cast iron, prestressed concrete, asbestos cement and the like during the last three decades in developing as well as developed countries.

Originally developed in the US in the 1940s, they were initially available only to chemical process plants as a replacement for stainless steel pipes. The invention of continuous filament winding machines and the technique of curing the matrix on the machine itself brought large diameter pipes within the reach of municipalities and power plants.

Efforts are on to procure Bureau of Indian Standards specifications for GRP pipes, Mr. Lakhotia told "Financial Express." The initial reaction of some professionals who saw specimens of the pipe was that "it looks so thin!" GRP's strength-to-weight ratio is better than that of steel, and the apparent thinness is deceptive he pointed out.

'INDIA WILL BECOME MAJOR BAUXITE PRODUCER'

India will become a major bauxite producing country when the eastern coast deposits are tapped and surplus in alumina and aluminium, Mrs. Ramdulari Sinha, minister for state for mines, has said.

A number of initiatives are being taken to boost domestic consumption of aluminium as well as export of alumina and aluminium products, Mrs. Sinha said, while inaugurating the 13th session of the council of ministers of the International Bauxite Association at Kingston, Jamaica recently.

She said, since the interdependence of bauxite-alumina and aluminium would continue, it was essential that bauxite exporting countries should obtain fair and economic prices for the export of these metals.

She called upon bauxite and alumina-producing countries to increase their production to the maximum capacity and promote the use of these metals in building up their industrial superstructures.

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Impasse over drugs order to end soon

The Union Government will soon announce measures to end the stalemate over the implementation of Drugs (Prices Control) Order (DPCO), 1987. The initiatives will include adoption of the concept of "therapeutic dominance" for determining whether a multi-ingredient formulation should be out of the purview of price controlled categories and referring the trade margins issue to the Kelkar Committee.

It is understood that the Department of Chemicals and Petrochemicals (DCP) has accepted the industry's contention that the uniform adoption of the categorisation norms would bring all multi-ingredient formulations containing even a minute percentage of bulk drugs specified for the price-controlled categories I and II. This would run counter to the very objective of reducing the span of price regulation to most essential drugs and to manageable levels.

Under DPCO, 1987, category I includes all formulations made from 27 specified bulk drugs either individually or in combination with any other drug. Similarly, category II includes all formulations produced from specified 139 bulk drugs either individually or in combination with any other drugs.

Soon after the announcement of new DPCO on August 26, 1987, the industry started representing to the DCP that these categorisation norms would bring under price control several formulations which are supposed to be freed from such regulations just because of the fact that they contain marginal quantity of bulk drugs specified for category I and II formulations.

The industry representatives explained that an insignificant percentage of such drugs is added to price exempted formulations just to improve the "availability" of the dominant ingredient to the human body or to give a better "feeling" to the patient.

If the Government implemented the categorisation norms as mentioned in DPCO, the manufacturers would have no option but to discontinue the addition of price-controlled bulk drugs to their multi-ingredient products to escape the price regulations. This escape strategy would, however, hurt the consumer, for he will be denied the benefit of better formulation.

The industry representatives thus argued that the concept of therapeutic dominance should be applied to determine whether such a multi-ingredient formulation should fall under the price controlled categories. If a enzyme formulation, for instance, is meant to rectify a metabolic defect but also contains a minute amount of price-regulated drug, then it should be kept out of category I and II.

The DCP has accepted this concept of therapeutic dominance with the stipulation that all such cases of multi-ingredient formulations will be referred to Drug Controller or Health Ministry for deciding whether they should be kept out of category I and II. An official notification on this issue is expected to be released soon. Similarly, DCP is expected to clarify other provisions which have created confusion in the industry. A case in point is the definition of 'maximum allowable post-manufacturing expenses' (MAPE).

The provision that MAPE "shall not exceed" 75 per cent of the ex-factory price of a formulation in the case of category I formulations and 100 per cent in the case of category II ones had given an impression as if the Government wanted to fixed minimum or below maximum percentage also.

This misgiving was borne out of experience with multi-vitamin formulations which fell under category III under DPCO, 1979. Though these formulations were entitled to 100 per cent MAPE (mark-up in old parlance), the Government allowed only 60 per cent mark-up in most of the cases. The DCP will now issue a notification clarifying that MAPE means only 75 per cent in case of category I and 100 per cent in the case of category II.

As regards the contentious issue of readjusting the trade margins or commissions for wholesalers and retailers, the Department has taken a serious view of the rigid stand adopted by manufacturers, wholesalers and retailers over the issue and the consequent failure of talks between them.

It is understood that both the Minister for Chemicals and Petrochemicals, Mr. R. K. Jaichandra Singh and DCP Secretary, Mr. H. K. Khan, are keen to resolve the issue, as it can stall the implementation of DPCO, 1987, in which the Government has taken pains to protect the conflicting interests of various sections of industry and trade as well as consumer.

The DCP feels that the issue can be solved either by referring it to Kelkar Committee, which was originally set up to identify category II drugs, or by referring it to a new panel. It, however, believes that it would be better to entrust the job to Kelkar Committee which has a comprehensive understanding of all aspects of drug policy. This panel could be asked to give its views on trade margins within 15 days or so. Whatever be its recommendations, all sections of industry and trade would be able to abide by it.

The crux of the controversy is that the wholesalers are feeling sure over the only one per cent increase in their commissions under DPCO, 1987, and want a raise. The industry which apparently sympathises with wholesalers feels that this raise can be given by cutting into retailers' commission which has been raised by a hefty five per cent. The retailers are, however, in no mood to yield and would rather love to see their commission go up further.

— Indian Post

AMMONIA, UREA PLANTS FOR FACT : PLEA TO PM

A delegation of the Kerala State Public Sector Employees Federation met the Prime Minister, Mr. Rajiv Gandhi, on November 6, and urged him to allot ammonia and urea plants to the Fertilisers and Chemicals of Travancore Ltd., (FACT) at Udyogamandal.

If the Rs. 383-crore projects were not included in the current Plan, it would result in the retrenchment of 1,100 employees in FACT, the delegation said in a memorandum.

The delegation, consisting of Prof. K. V. Thomas, MP, and the Federation General Secretary, Mr. Devassy Kutty Padayattil, said the 40-year-old FACT ammonia plant could not continue production for long and, therefore it was essential to have the new plants there.

RECOVERY OF UNINTENDED PROFITS :

Will recovery move succeed

The pharmaceutical industry is not unduly perturbed over reports that the Government intends to recover "unintended profits" running into several crores of rupees from the industry.

For one thing, the Government does not have up-to-date company-wise data on how much each unit owes on this account and as such no immediate action is feasible. Secondly, the list of companies includes several fully-owned Indian firms wielding considerable clout, and even public sector units.

It is unlikely that the Government would embark on an action which would seriously threaten the very existence of these companies, industry sources feel. In some cases, the amount due to the Government exceeds the paid-up capital of these firms.

The Government approves prices of formulations involving imported bulk drugs on the basis of the international price of the drug at the time of application. In cases where bulk drug prices fell subsequent to price fixation, the industry was expected to apply to the Government for reduction of formulation prices.

Very few companies obliged. The industry argues that if it did not approach the Government for price reduction, neither did it ask for price increases when the bulk drug prices in the international markets shot up. Moreover, local costs of other ingredients that go into a product pack had gone up, with no corresponding hike in the price allowed to the company.

However, the Government regards it as a case of profiteering, "unintended profits" and over-charging of consumers by the industry. Observers point out that the Government has been far from vigilant in exercising its powers in a matter on which it professes so much concern. The Government has powers to reduce prices suo moto by issuing a notification, without waiting for industry's application.

It did not exercise this power, except in a few cases. There are also cases where the Government did not take action even after the industry submitted an application for price revision.

As a result, the industry continued to market at Government approved prices, irrespective of fluctuations in bulk drug prices. The Ministry woke up to the issue only when an occasional question was raised in Parliament.

Once every year, the Drug Controller's office compiles the item-wise imports of bulk drugs from the records of the office of the Chief Controller of Imports and Exports (CCI and E). For a company-wise break-up of these figures, the Government will have to approach the respective companies or refer the Customs documents in each port.

Enquiries reveal that the Government's data is limited to seven companies about whose dues it reported to Parliament in answer to a question in 1985. The details are as under:

Co.	Drug	Amount in Rs.
Fulford	Gentamycin	1.94 crores
Lupin	Rifampicin	2.16 crores
Biochem	Gentamycin	34 lakhs
Ethio Drugs and Chemicals	Rifampicin	1.41 crores
Ranbaxy	Rifampicin	36 lakhs
Lyka	Gentamycin	17 lakhs
Lyka	Rifampicin	57 lakhs

Only one company out of the above seven, Fulford, paid part of its dues to the drug price equalisation account (DPEA). Fulford, which lost a petition in the Supreme Court, paid Rs. 50 lakhs in two instalments.

More than 100 companies have been served notices for repayment of "unintended profits". The list includes public sector units like IDPL, Bengal Chemicals and Smith Stanistret, multinationals like May and Baker and Roussel. The majority consists of Indian companies, including the prominent names like Alembic, Cipla, Cadila, Ranbaxy, Sarabhai, Lupin and Zandu.

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FEDO : Waiting on the wings

Two major divisions of the State-owned Fertilisers and Chemicals Travancore Ltd. (FACT), Fact Engineering and Design Organisation (FEDO), and Fact Engineering Works (FEW), have geared up for expansion and diversification into new areas to shore up its order book position and boost turnover.

But the success of such attempts particularly by FEDO depends largely on the Union Government's decision to award some fertiliser, petrochemical or metallurgical consultancy and design jobs to it. As of now, all fertiliser consultancy jobs are going to the Projects and Development of India Ltd. (PDIL), while petrochemical and metallurgical projects are being awarded to Engineers India Ltd. (EIL) and Metallurgical and Engineering Consultants India Ltd. (MECON), respectively.

According to the Chairman and Managing Director of FACT, Mr. N. B. Chandran, the Government must give FEDO and FEW the opportunities to make use of their knowledge and expertise accumulated by them over the years in these fields.

'If this does not happen soon, the knowledge acquired in the course of the last 21-22 years of their existence would go waste", Mr. Chandran said.

The story of FEDO is indicative of the Government's step-motherly treatment towards this organisation, which was established in 1966 to meet the emerging need for indigenous capabilities in the field of engineering, design, construction and management of chemical fertiliser plants. It also obtained a process know-how agreement with MW Kellog Company of the US for fertiliser plants.

But when it came to awarding the consultancy contracts for fertiliser plants to be set up during the Sixth and Seventh Plans, FEDO got only one, while its public sector competitor, PDIL, got as many as 10 plants.

In a bid to prove that FEDO is good at its job in executing fertiliser projects, if not better than PDIL, the FEDO officers built the two 1,350 tonnes per day (TPD) ammonia plants at Hazira which were brought to full load operation in less than 90 days of the start-up.

The plant also achieved a capacity utilisation of 93.4 per cent during the first year of operation. What is more interesting is that while the Hazira plant's total plant cost was Rs. 392 crores, the cost for a similar plant at Thal, implemented during the same period by PDIL with Snam Progetti know-how, was much higher at Rs. 484 crores.

So far FEDO has completed over 47 projects including nine sulphuric acid plants, four pesticides plants, six effluent treatment plants, three antibiotic plants, three non-ferrous metallurgical plants, seven acid plants (other than sulphuric acid), one petrochemical plant, seven fertiliser and salt plants and seven ammonia and hydrogen plants.

It has also bid for several other new fertiliser projects like the 1,350 TPD ammonia plants to be put up by Gujarat State Fertiliser Company and Apeejay Group. FEDO is keen to get a share of the petrochemical and metallurgical projects to be set up in the next few years so that its order book position remains comfortable.

FEDO's current projects include a sulphuric acid plant at Paradip, a methanol at Bharuch and another pyrite based sulphuric acid plant at Amjhore.

Financial performance of FEDO is also expected to improve from the 1986-87 income and profit levels, once the organisation starts getting orders for petrochemical and some fertiliser projects.

At present, FEW's shop fabrication capacity and project construction capacity are pegged at 360 tonnes and 300 tonnes per annum, respectively. With these capacities, FEW's present functions mainly centre around shop fabrication of pressure vessels, alloy steel items, heat exchangers, ship components and other equipment needed for fertiliser, process industries and space research.

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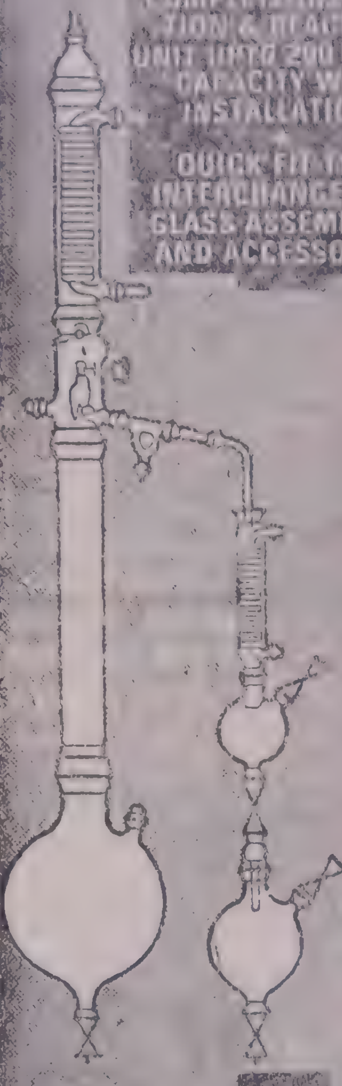

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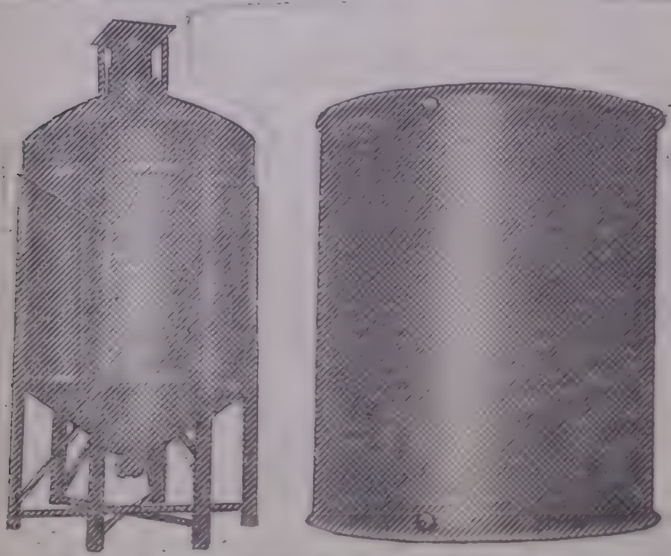

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IRON ORE :

MMTC's bid to boost exports

The Minerals and Metals Trading Corporation (MMTC) is making a brave effort to keep up India's export of iron ore in the face of shrinking world market, falling prices and rising production costs.

While the world steel production came down from 719 million tonnes in 1985 to 714 million tonnes in 1986 and is expected to touch a new low of 700 million tonnes this calender year, MMTC's exports of iron ore have gone up from 16 million tonnes in 1984-85 to 18 million tonnes in 1986-87.

But this is not without cost. MMTC has been losing heavily on iron ore exports. In 1987-88, it is expected to lose between Rs. 15 crores and Rs 20 crores on iron ore exports.

According to one estimate, the iron ore prices in the world have come down by 20 per cent in the past three years and the cost of production has gone up by an equal percentage during that period. Though the steel production capacity in the world now is around 850 million tonnes, the production is barely 700 million tonnes.

As explained by an official, the main reasons for the fall in steel production the world over and the consequent fall in iron ore prices are the closure of old and sick mills, phasing out of some obsolete processes like the open hearth process, and massive substitution for steel, in the automobile and construction industries — the two main consumers of steel.

Another major reason for stagnation in steel production is that the investment in steel plants is becoming excessively high making it less attractive in the present circumstances. In fact, many of the Japanese steel manufacturers are now diversifying into electronics.

A team of newsmen recently visited the Bellary-Hospet sector to see the arrangements made by MMTC to export the high-grade ore available the region and the herculean task undertaken by the miners to increase its production. The team also visited the Goa sector to watch the dredgers being loaded with iron and the transhipment taking place in mid-sea.

The Bellary-Hospet sector produces a high grade ore which compares very favourably with the Australian or Brazilian ore. The sector has proven reserves of 300 million tonnes in an area of 850 acres.

From the Madras port, the sector exported 3.183 million tonnes in 1983-84, 4.289 million tonnes in 1984-85, 4.786 million tonnes in 1985-86 and 5.349 million tonnes in 1986-87.

A visit to the semi-mechanised privately-owned iron ore mine in the Hospet sector revealed the none-too-hostile conditions under which the miners work bringing prosperity to the region and the precious foreign exchange to the country. The mine had all the basic facilities like school for the miners' children, a dispensary, houses and even a temple. The mine also had adequate safety arrangements and had in fact won a number of safety awards.

The state-owned National Mineral Development Corporation (NMDC) also has a fully-mechanised iron ore mine at Donamalai. The mine has been excellently developed and has been highly mechanised. The crushing and loading of the ore was also being done mechanically.

But it would be wrong to say that everything is fine with the mines, the miners or the mine-owners. Mr. Abdul Wahab, acting president of the Bellary-Hospet sector mineowners' and suppliers' association, said that the mineral right tax is hanging over their heads like the Damocles' sword. Though the matter was under litigation, if it is implemented, many of the mineowners will go into liquidation, he said.

He also lamented the lack of coordination among various government departments so far as the renewal of mine leases was concerned. He said that the renewal should be automatic in case where the mineowners has not defaulted on any other account. He said that the dragging of feet by various government departments when it comes to renewing a lease, adversely affected the development of the mine.

The one point on which all the mineowners were unanimous in their opinion was the one regarding the conservation of forests in the mining areas.

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GAS-BASED THERMAL PLANTS :

Negotiations on with IBRD

The Government is negotiating with the World Bank for the financing of a gas-based thermal plant in the country, the Minister of State for Petroleum and Natural Gas, Mr. Brahm Dutt told the Rajya Sabha.

He told the House during Question Hour that the Krishna Godavari and Cauvery basins had proved to be rich areas.

The Government proposed to utilise the gas available from these two basins as it was doing with natural gas from Bombay High. The Planning Commission was also seized of the matter, he said.

Replying to a spate of supplementaries, Mr. Dutt said five consumers had so far been identified for the gas available from the Krishna-Godavari basin. The Oil and Natural Gas Commission was in touch with the Andhra Pradesh Government, he said.

Gas supplies to industrial units in Andhra Pradesh from the basin were expected to start by the end of the calender year, he said.

Initially, infrastructural facilities were being created to supply 0.15 million cubic metres of gas a day to be stepped up to one million cubic metres a day by the end of the Seventh Plan, he said.

The Minister said that the USSR had been given the turnkey project for exploration of oil and gas in West Bengal.

Oil import saving :

The country saved about Rs. 54 crores on the import of crude oil in the first six months of the current financial year.

In a written answer Mr. Dutt said the domestic crude oil production target of 30.46 million tonnes set for the year was expected to be achieved. Production of crude oil during the first six months of the current year was 15.18 million tonnes, against the target of 14.85 million tonnes.

Crude oil production in 1986-87 was 30.50 million tonnes.

To another question, the Minister said although LPG availability in the country had increased in recent years, self-sufficiency was not likely to be achieved in the near future as the demand continued to grow at a much higher rate than supply.

HUGE HYDROCARBON RESERVES FOUND IN CACHAR BELT

The Cachar belt covering an area of 7,000 square km under Karimganj, Cachar and North Cachar districts of Assam has shown positive indication of a huge reserve of hydrocarbon.

An Oil and Natural Gas Commission spokesman said that ONGC has already discovered 8.32 million tonnes of hydrocarbon in the area and hydrocarbon resource appraisal study indicated a reserve of 460 million tonnes of oil and oil equivalent gas.

In view of this enormous potentiality of hydrocarbon reserve in the region, ONGC has envisaged plans to intensify exploration activities in the Cachar belt during the Seventh Plan itself, the spokesman added

Meanwhile, ONGC has set a target of producing 200 tonnes of crude daily from the next year. ONGC would also start drilling at Dhantran from January next, the spokesman said.

Two ONGC geological parties would delineate the structures mapped earlier and cover an area of 3,150 square km during the remaining part of the current Plan period, he said.

ONGC is also envisaging release of additional resources in the region, he said adding that five rigs including one mobile rig have currently been operating at Silchar area.

WORLD BANK CHIEF VISITS IPCL

The president of the World Bank, Mr. Conable paid a visit to the public sector Indian Petrochemicals Corporation (IPCL) complex at Baroda. The World Bank has advanced a $210 million loan for IPCL's gas cracker complex at Nagothane in Maharashtra and $90 million for import of products for market-seeding activities.

He also held discussions with IPCL chairman Mr. S. Ganguly.

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TECHNOLOGY DEVELOPMENT :

IIT's, Industry tie up

The private sector industry is on its own technology mission. The industry and the Indian Institutes of Technology (IIT's) have embarked on a major co-operative venture to realise the unutilised potential in technology development.

The areas identified for joint action include research and development, personnel exchange and setting up of university industry foundations and technology parks.

There was considerable brain-storming on this critical issue at a recent meeting of the chairmen and directors of IIT's with the representatives of the Confederation of Engineering Industry. (CEI).

It was decided to constitute joint task forces on areas such as energy conservation, environment protection and pollution control, new materials, system engineering, low-cost automation, technology scanning and foreign collaborations, reliability and maintenance engineering.

These task forces would report on the approach to be adopted in these areas to another meeting of the chairman and directors of IITs with the CEI members to be held soon.

It was decided that IIT's would enter into a memorandum of understanding with CEI to formalise the co-operation in research and development.

The meeting was attended by Mr. D. V. Kapur, chairman, IIT, Bombay, Dr. H. N. Sethna, chairman, IIT, Delhi, Prof. K. I. Chopra, director, IIT, Kharagpur, Prof. A. K. Mallik, director, IIT, Kanpur, Prof. B. Nag, director, IIT, Bombay, Prof. I. S. Srinath, director, IIT, Madras and Prof. N. M. Swani, director, IIT, Delhi.

CEI was represented by its president, Mr. Suresh Krishna, vice-president, Mr. Brij Mohan Lall, Mr. S. G. Ramachandra, Mr. A. Y. Divekar, Mr J. M. Joshi, Mr. Janak Mehta, Mr U. P. Pandit, Mr. M. M. Parpia, Mr. Ranjit Puri, Mr. A. Madhava Rao and Mr. K. N. Shenoy.

The meeting took note of the fact that 2,000-strong IIT faculty was not being properly utilised by the industry. It was felt that industry would benefit by using the research and development experience available with the faculty.

IIT's have all the resources for scanning and assessment of technologies. A joint effort would help create a formidable technology data bank for use by the industry.

It was proposed that industry should provide two/three months exposure to select faculty members to discuss industry problems. A similar exchange for industry representatives would be useful to communicate and establish a report with the institutes.

The meeting also discussed a proposal for a group of industries setting up R and D facilities in the institutes, which could be used by both.

It was decided that an apex group of CEI-IIT representatives would review and develop an action plan to set up industry foundations in the institutes.

Considerable significance is being attached to these deliberations in view of the urgent need for reducing dependence on foreign technology by the private sector. A national workshop will be held in Bangalore on November 20-21 to have greater interaction on the subject.

MRTP ACT AMENDMENTS : CABINET TO GIVE APPROVAL SOON

Several crucial amendments to the Monopolies and Restrictive Trade Practices Act are likely to be approved by the Cabinet shortly.

The amendments are being introduced as part of the drive to step up the pace of industrial growth, especially in view of the fact that production is not rising to the desired extent.

One of the most eagerly awaited of these amendments is the liberalisation of rules regarding inter-connection of companies. This sensitive issue has been examined several times by the government, but a decision has eluded policy-makers.

A group of ministers is now believed to have proposed that the principle of commonality should be adopted while deeming companies to be inter-connected. Thus, in case a director or his relatives comprise one-fourth of the board of a company as well as one-fourth of the board of a second company, the two companies will be deemed to be inter-connected.

In addition, the group of ministers has examined a proposal to raise the assets limit for dominant undertakings from Rs. 1 crore to Rs. 5 crores. But a consensus on this issue could not be reached because some ministers felt that the assets limit for dominant undertakings should be increased to Rs. 10 crores. A final view will now have to be taken by the cabinet.

The decision to raise limits of assets for purposes of defining dominance of undertakings has been taken to bring this in line with the rise in the assets limit of monopoly houses from Rs. 20 crores to Rs. 100 crores. Since the hike in the assets ceiling for monopoly companies was effected about two years ago, it was felt that an increase in the assets limit for dominant undertakings was over-due.

The government also plans to make some changes in the MRTP Act relating to the functioning of the MRTP Commission.

These include measures to give more teeth to the commission in dealing with offences against consumers. It proposes that the MRTP Commission be given powers to issue temporary injunctions against parties alleged to be indulging in unfair trade practices, even before a formal enquiry is instituted. At present, the commission can only issue a temporary injunction after the enquiry is launched.

Efforts are being made by the industry ministry to ensure that the amendments to the MRTP Act are finalised as expeditiously as possible. The proposed amendments are, therefore, expected to be posed for Cabinet approval very soon. In case a final decision is taken at this level speedily it may be possible to introduce the amendments during the current session of Parliament. But since cabinet decisions, especially on such sensitive issues, are often delayed, official circles expect that the amendments may have to be postponed till the budget session.

The industry ministry is apparently keen that the amendments should be enacted quickly since they are expected to remove significant procedural hurdles for the corporate sector. Besides, it is felt that these amendments will contribute to an improvement in the industrial climate. As things stand now, the industrial growth rate is expected to be only about 6 to 7 per cent in the current financial year as against nearly 9 per cent in 1986-87.

IIT technology causes heavy losses

An improperly tested technology, prematurely released by the Indian Institute of Technology (IIT), Delhi has thrown several entrepreneurs in dire straits.

A few years ago, the fuel research cell under the Department of Chemical Engineering of IIT had patented to private machinery fabricators a technology designed to exploit non-conventional sources of energy, for which emphasis was given in the late Prime Minister Indira Gandhi's 20-point programme.

About 70 briquetted fuel manufacturing units, set up with the technology in various parts of the country, are today idling as the machinery has in practice not been able to live up to its propagated qualities.

Briquetting is the process of converting loose agricultural wastes (biomass) like husk, groundnut shell and saw dust into compact burnable fuel which could be used as substitute for coal and firewood.

A survey on the status of the briquetting units in the country, conducted by the National Productivity Council (NPC) at the instance of the Directorate of Non-conventional Energy Sources (DNES), has revealed that "the technology seems to have been commercialised without a full-scale testing of the system design and layout and without proper scrutiny of the mechanical integrity of the system. Consequently out of the 70-odd plants installed not a single plant was found to work continuously or satisfactorily."

This has resulted in heavy loss to entrepreneurs who are not in a position to repay the loans, mostly taken from State financial corporations, the survey report says.

On the basis of the report, DNES has decided to take up research and development works on perfecting the technology, and has directed all financial corporations not to give financial assistance to any new unit based on the design given by IIT, Delhi, according to official sources.

According to Mr. M. K. Ganesh, President of the All-India Briquetted Fuel Manufacturers Association, the viability of the units depended upon the guaranteed output of 3.4 tonnes per day with a rated capacity of four tonnes. But most of the units were able to get an output of only 1.5 to two tonnes, making them non-viable. Besides, the machinery developed problems on continuous running, which resulted in frequent shutdowns for repairs.

The Association has urged DNES to provide relief by treating the cost of the machinery as a research and development (R and D) expenditure as it is a "clear case of release of technology before extensive trials" and the non-functioning of the units is not due to the fault of the entrepreneurs.

Though DNES was not at any stage involved in the development and propagation of the technology, it had requested State financial corporations to provide suitable fiscal and financial relief to the entrepreneurs.

The technology had been patented to three companies — one each in Madras, Chandigarh and Bombay. But only the first two commercialised it.

The NPC report points out that plants supplied by the Madras firm experienced extensive mechanical damage due to lack of provision for expansion joints in the pyroliser (main conversion unit), wrong use of the grade of stainless steel for the pyroliser and non-functioning of dryers. The plants supplied by the Chandigarh firm were of a better mechanical design, but even they did not give consistent production and the product yield was very low — only 38 per cent as against the viable yield of 50-55 per cent, it adds.

The National Small Industries Corporation (NSIC) initially marketed the plants produced by the Chandigarh firm but suspended it following complaints from buyers.

Mr. G. Ramesh, Managing Director of the Trivandrum-based Huskoal Energy Systems, one of the two briquetted fuel manufacturing units in Kerala, has said he was able to run his unit for a total of only 28 days after it was set up at a cost of Rs. 10.08 lakhs in 1986.

The other unit in Kerala is in Kasargod. There are about 23 units in south India, most of which are in Tamil Nadu and Karnataka.

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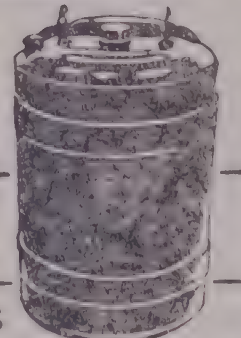

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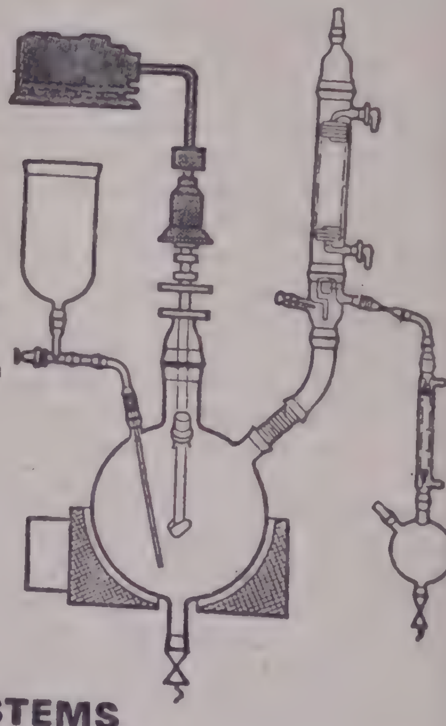

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Woes of SSP industry

The single super phosphate (SSP) industry is fighting a battle for survival with its back to the wall. The prejudices against it have increased manifold and its woes are multiplying with every passing year.

Even though the entire fertiliser industry is facing serious problems because of the glut situation prevailing for more than 18 months now, the SSP manufacturers are passing through a still more difficult phase. This is because of heavy build-up of inventory, despite having curtailed their production consciously and because of excess availability of DAP in the market caused by its high imports during 1984-85 and 1985-86.

Moreover, SSP is at a disadvantage not only in terms of price per unit of nutrient vis-a-vis DAP (Rs 5.94 per kg of P_2O_5 in SSP compared to 5.83 in DAP) but also due to lower distribution margin and non-recognition of secondary freight in its case, which tends to hamper its movement, despite its having an additional secondary nutrient — sulphur.

The problems of the SSP industry became so acute that during 1986 the manufacturers were forced to cut down production. The average monthly production of SSP was 156,000 tonnes during 1986 compared to 179,000 tonnes during 1985 recording a decline of nearly 13 per cent.

This reduction in production was despite an increase in installed capacity of SSP from 3.32 million tonnes at the end of 1985 to 3.77 million tonnes by the end of 1986.

However, in spite of this drop of 13 per cent in SSP production, the average monthly stock increased from 238,000 tonnes in 1985 to 322,000 tonnes during 1986 recording an increase of 35 per cent. The year 1985 itself had seen an increase of average monthly stock of SSP by nearly 57 per cent over the average stock level of 1984.

In view of the very difficult market conditions, SSP manufacturers had to move their product up to block headquarters despite their not getting any secondary freight which further eroded their profitability.

The viability of SSP manufacturers is also seriously eroded due to non-recognition of several items of legitimate costs such as power, port and transport charges in respect of inputs. The increase in granulation charges which were last fixed in mid 1983 has also not been recognised so far by the government despite substantial increase in cost of various inputs that go into granulation process.

The SSP industry has also been affected adversely by further shrinkage in its marketing areas under the Essential Commodities Act which has aggravated the build-up of the manufacturers' inventory and has created serious liquidity problems for the manufacturers, besides eroding their profitability.

As a result, a number of units either curtailed their production or stopped it altogether for some time to reduce their losses since they were being forced to offer very high rebate and discounts in view of excess availability of DAP.

The Fertiliser Association of India, in its annual review of 1986-87, has hoped that the government will take into account the problems confronting the industry and tackle these urgently to help revive the industry which "is not only supplying P_2O_5 but also sulphur, which is one of the essential plant nutrients though unfortunately a neglected one in India in fertiliser planning."

The association is emphatic that with intensification of agriculture, the agricultural scene in India is changing rapidly. "Some of the nutrients including sulphur, which were not deficient a decade ago, are now of major importance. It is in this context of growing deficiency of sulphur that we should realise the important role of SSP as a fertiliser not only supplying P_2O_5 but also 12 per cent sulphur which could play a more important role in crops like oilseeds, pulses and potatoes," says the association.

FERTILISER USE MAY RISE MARGINALLY

The fertiliser offtake in the current rabi season is going to be marginally higher at five million tonnes as against last year's rabi consumption of 4.3 million tonnes of fertilisers.

The likely increase in the fertiliser consumption is attributed to improved rabi outlook as a result of late rains in Bihar, Uttar Pradesh, West Bengal, Punjab, Haryana, parts of Andhra Pradesh, Madhya Pradesh and Maharashtra.

The fertilisers offtake was considerably lower at 3.6 million tonnes in the kharif season just ended because of failure of monsoon in most parts of the country. In the previous kharif, fertiliser consumption was 4.1 million tonnes.

The total fertiliser consumption will still fall short of last year's level by 0.2 million tonnes at 8.9 million tonnes.

Industry sources at Bombay think that there would be a pick up in demand for fertilisers during November, December and January. The government is also trying to push up the fertiliser consumption to a level of 5.2 million tonnes during the rabi season.

Even if the government is able to achieve a consumption level of 5.2 million tonnes during the current rabi season the growth in fertiliser consumption in the current year will be negative.

I.I.Chem.E. SEMINAR ON 'TECHNOLOGY UPGRADATION'

The Indian Institute of Chemical Engineers, Ahmedabad Regional Centre is organizing a National Seminar on "Technology Upgradation in Chemical and Allied Industries" at Ahmedabad on 6th January, 1988. The seminar shall be sponsored by Government of Gujarat — Industries Commissionerate, Indian Chemical Manufacturers Association, Industrial Development Bank of India and Ministry of Science and Technology. Senior officials from Government of India, Financial Institutions and the industry shall be involved in organizing this seminar. The topics shall cover modernization upgradation of technology for a wide spectrum of industry including small scale sector and role of financial institutions/consultants. The seminar is expected to be useful to the policy makers and captains of industries. Further details may be had from Shri A. K. A. Rathi, Hon. Secretary, Indian Institute of Chemical Engineers, Ahmedabad Regional Centre, Chemical Engineering Department, L. D. College of Engineering, Ahmedabad-380 015.

RRL technology for 4 vital drugs

The Regional Research Laboratory (RRL) in Hyderabad has developed technology for the manufacture of four vital drugs, two of which could be used on AIDS and cancer patients.

The four drugs — azidothymidine, used for prolonging the life of AIDS patients, etoposide an anti-cancer agent, flurbiprofen, an analgesic agent and minoxidil, used for curing baldness — were expected to go on commercial production next year, the RRL Director, Dr. A. V. Rama Rao said.

At present these drugs were not being manufactured in the country and the work on the drugs at RRL had been sponsored by various drug companies.

Dr. Rao said the price of azidothymidine would be exorbitant but had good export potential. Etoposide used especially for lung cancer was made from a natural product called podophylotoxin (from a plant called podophylum emodi found in the Himalayan region). Flurbiprofen, a pain-killer, was now being imported and formulated by a Bombay-based company.

He said minoxidil was an accidental discovery. It was originally meant as a cardiovascular drug but proved good for those showing tendency for baldness.

A programme had been initiated to develop technology for "aspertame" — the synthetic sweetener used widely in other countries but yet to be introduced in India, he said.

Dr. Rao said the RRL had obtained promising results in the development of a simple and effective method for the stabilisation of rice bran which could be adopted by even small rice mills.

RRL was actively engaged on materials for low cost housing, doors and wooden panels had been prepared using integral foam as core material and it was being evaluated by the Central Building Research Institute (CBRI) Roorkee. It was also developing new types of coatings for protection of metal against corrosion and polymers for structural adhesives.

He said for successful transfer of laboratory level technology to industry pilot plant data was desirable, where large capacity plants had to be installed. For this purpose the RRL had involved its chemical engineering and mechanical engineering groups for designing commercial units.

In the past one year, RRL had released seven processes to industries for commercialisation, carrying a lumpsum amount of Rs. 9 lakhs by way of premium. Royalties of about Rs. 40 lakhs were expected from these processes, he added.

BREAKTHROUGH LIKELY IN CANCER RESEARCH

Scientists at the Centre for Cellular and Molecular Biology (CCMB) in Hyderabad appear to be heading for a breakthrough in cancer research.

Encouraging results have been obtained from studies on a comprehensive theoretical model which explains the mechanism of regulation of normal cell division and of malignant transformation through control of uptake of essential nutrients by a transport-inhibitory protein, the Centre Director Dr. P. M. Bhargava said. Such a protein has been isolated from rat liver and an immunologically similar but biologically inactive protein has been purified at the Centre.

Isolation and purification of these proteins provide support to the model developed at the Centre.

When normal cells are transformed, they exhibit altered surface properties. A tumour-associated transplantation antigen (TATA) has been identified and purified. Animals immunised with this antigen have shown partial protection against the tumour.

Dr. Ashok Khar, who is engaged in the research alongwith Dr. Bhargava, said that tumour cells grown intraperitoneally have been separated into two distinct sub-populations. Answers to their origin and the mechanism of their intraconversion would throw light on the killing potential of tumour cells and the generation time of cells, he said.

A new ascitic tumour named AK-5 which appears to have originated from a macrophage cell has been established at the CCMB and is being maintained in rats. This is the first macrophage-like cell line maintained in the ascitic form, which is of rat origin. The few macrophage-like cell lines known so far are of human or mouse origin.

Dr. Bhargava said that spontaneous rejection of tumours was rare. The AK-5 macrophage tumour which was developed in the CCMB was unique as 50 per cent of the animals injected sub-cutaneously with the tumour cells rejected the tumour. The mechanism of this rejection has now been worked out.

Dr. Bhargava said the CCMB was an outstanding leader in many areas and that it was concentrating on new ideas only. Some of the laboratories at the Centre were the best in the world, he said.

KALYAN BELT COULD FACE WATER CRISIS

The Kalyan industrial belt situated on the banks of the river Ulhas and more than 20,000 families in Kalyan will face a serious water crisis if timely measures are not adopted immediately to prevent water being drawn from the river.

According to a press release in Bombay the water of the river is being used for drinking, industrial production, irrigation and also by the Bombay Municipal Corporation (BMC). It is desired that the drawing of water by the BMC should be stopped to improve the water level says the Kalyan Ambarnath Manufacturers Association.

EXEMPTION FOR SMALL DRUG UNITS HAILED

The Indian Drug Manufacturers' Association has welcomed the exemption granted to small scale industrial units from the provisions of the Drug Price Control Order 1987, in respect of formulations specified in Category II.

CIL PRODUCTION UP

Coal India's cumulative production was 784.01 lakh tonnes of coal during April-October, against 711.81 lakh tonnes during the corresponding period last year, showing a growth rate of 10.1 per cent or 72.20 lakh tonnes in absolute terms.

HBJ PIPELINE :

GAIL, Grindlays sign loan pact

The state-owned Gas Authority of India Limited (Gail) has concluded £ 18-million loan agreement with the Grindlays Bank for the implementation of Hazira-Bijaipur-Jagdishpur (HBJ) natural gas pipeline project being implemented byToyo Engineering Corporation of Japan.

Under the $ 36 million contract awarded to Toyo Engineering Corporation, this Japanese company is overall supplier with responsibility for equipment procurements from the UK for the pipeline project.

According to a bank press release a formal agreement for the loan of £ 18 million was signed by Gail and the Grindlays Bank in London on October 28, 1987.

The loan carries the guarantee of the Government of India and has a 12-year maturity with an interest rate of 7.4 per cent fixed throughout the life of the loan. The loan will be repaid over 10 years starting in June 1989.

The financing has been arranged by Grindlays Bank (a member of the ANZ group) and funds will be provided by Grindlays Bank, Barclays Bank and State Bank of India. This financing is supported by Export Credits Guarantee Department (ECGD) of the UK and is the first such facility from the UK to be utilised by GAIL.

The balance of the finance will be provided by an aid and trade provision (ATP) grant for up to a maximum of £ 6 million extended to the Government of India by the UK government.

The financing is also the first of its type for Toyo Engineering Corporation in the UK. As a result of the appreciation of the Japanese yen in recent years, Toyo is keen to develop their overseas procurement function.

The major UK sub-contractor is Ingersoll Rand, with a contract for the supply of compressors and turbines. Other UK suppliers include Compair Broom Wade Limited, Cameron Ironworks Limited, Serck Audco Valves, How Fire Limited, Carmichael Fire and Bulk Ltd. and Metro-Flex (UK) Limited.

The main contract for the HBJ natural gas pipeline turnkey project was signed in May 1986 between a three-member French-Japanese consortium comprising Spie Capag, NKK and Toyo Engineering Corporation, Tokyo and Gas Authority of India, with a total contract value of $ 600 million. Officially supported credits have also been made available to GAIL in respect of equipment from France and Japan. Financing has also been arranged out of Italy in which Grindlays Bank played a part.

MASSIVE OIL HUNT AT COCHIN HIGH

In what is considered a bold and rare initiative, the Oil and Natural Gas Commission (ONGC) has embarked on a massive hunt in the hitherto unexplored Konkan-Kerala-Lakshadweep offshore basin of the country.

The first step towards this ambitious exploration plan was taken, when ONGC deployed a semi-submersible charter hire rig, Dilyxn-Fiend 95 (DF-95), 170 kilometres off Cochin on October 21 this year, in an area christened "Cochin High".

The rig spudded an exploratory well, CH-1-1, on the same day and is expected to drill to a targeted depth of 4160 meters, where ONGC scientists are hopeful of discovering hydrocarbon reserves.

ONGC sources in Bombay revealed that till date, 1000 meters of the total targeted depth has been drilled an the well is expected to be completed by the end of January 1988. Sources also expressed confidence that oil would be found once the well was sunk to the targeted depth.

On the basis of the existing siesmic survey, ONGC scientists have predicted a prognosticated geological resources in the basin to the tune of 300 million tonnes of oil and oil equivalent gas, sources disclosed.

"Cochin High" was first discovered in 1965 by the Soviet seismic survey ship "Akademic Arakhanglinsky," which worked in collaboration with ONGC.

The potentially oil-bearing "Cochin High" area is part of the Konkan-Kerala-Lakshadweep Offshore basin, which runs along the coast of South West India and covers a mammoth geographical area of 77,000 square kilometers.

Further exploration plans were shelved following the discovery of Bombay High in 1974 and all efforts of the Commission were directed to exploit this giant field at a rapid rate.

ONGC sources said that the expected discovery of oil in the Cochin High structure will enhance India's offshore oil reserves many items over. The total offshore reserves today stood at 10,129 million tonnes out of which Bombay High alone accounts for 7,389 million tonnes, while all the other offshore structures together contain a mere 2,740 million tonnes.

TATACHEM NOT TO CLOSE MITHAPUR UNIT

Tata Chemicals Limited firmly stated recently that its Mithapur chemical complex, by far the largest of its kind in the country, will not be shut down.

In a statement issued the company said it was faced with the severest ever drought conditions this year but had, through many technological innovations over the years, brought down its industrial requirements of fresh water from outside sources virtually to zero. In addition, as a part of a massive relief programme which it has undertaken, the company also ensures that none of the 42 villages in Okhamandal suffer from shortage of drinking water.

To meet the make-up water requirements of its captive steam-power plant and the processes, the company produces distilled water from brine in a highly energy-efficient and economic manner. High quality vacuum-evaporated salt is co-produced in this process.

The company iodises this vacuum-evaporated salt at its own cost and markets it throughout the country at a uniform price in dedicated support of the national campaign to fight 'iodine deficiency disorders', particularly goitre, which afflict about 140 million of our people.

The company did recently have some problems with the salt commissioner and the ministry of industry about the production and sale of vacuum salt co-produced with distilled water which is vitally needed for the operation of the Mithapur complex. These problems have now been satisfactorily resolved.

Rs. 500 cr. loss due to gas flaring

The loss resulting from the flaring of natural gas is conservatively estimated around Rs. 500 crores a year writes Kumar Ketkar in the **Economic Times**.

There are apprehensions that the magnitude of the loss will rise further particularly because of discoveries of more gas fields and the lack of appreciation at the highest level of the potential for the full utilisation of this hydrocarbon resource.

It is not that the glaring flaring of gas has not come in for severe criticism from petroleum experts but what is surprising is that an effective remedy for preventing such a flaring is yet to be found.

The current depressing state of affairs is attributed to lack of coordination among the various interests concerned and even to internal squabbles noticed in the petroleum sector as a whole.

For instance, the grandiose scheme of the national gas grid is elaborately discussed but has not yet taken off the ground. Or several private and public sector companies book in advance a certain amount of gas, but never lift Then there is also a big debate whether gas could be more profitably used for power or fertiliser. In fact, there is also a difference of opinion on the very need and utility of the national gas grid.

Though the geologists and geophysicists with their exploring talent a predicting big reserves of gas in India, it is known that more and more discoveries have surfaced.

Unfortunately, producer and user agencies are not adequately geared to take maximum advantage of the increased availability of gas.

It can be conceded that it is possible to hold on to the development of a free gas field and plan in a co-ordinated manner for its utilisation with the downstream facilities to a reasonable extent, it is not so in the case of associated gas.

For example, it has not been possible to make use of the total associated gas, which is incidental to oil production owing to delays in creation of downstream facilities in the north-eastern sector.

But inquiries show that lack of co-ordination between the various agencies in this sector is chiefly responsible for underutilisation of the associated gas.

How the gas acquired the central position in the overall energy scenario in the country can be seen from the fact that in 1961, when the gas production commenced, it was only at the rate of 0.1 million cubic metres per day.

The production of natural gas during 1986-87 was 8,176 million cubic metres. India's gas reserves have increased five-fold during the last 10 years and are expected to increase at a rapid rate.

The present level of the gas reserve is of the order of 1,005 billion cubic metres as on January 1,1987 and is expected to go upto 1,235 billion cubic metres by the end of the Seventh Plan.

Yet another important but relatively lesser known fact is that but for the substitution of crude derivatives by natural gas the total import bill of crude would have been far much higher. During 1986-37, the country spent a sum of Rs. 2,216 crores in foreign exchange for import of crude.

Compared with this the substitution by natural gas produced within the country brought about a foreign exchange saving of nearly Rs. 1,025 crores, that is about half as much as the total outflow of foreign exchange.

It is estimated that in 1990-91 the saving in foreign exchange would be of the order of Rs. 2,000 crores.

Presently, natural gas is being used as a feedstock for fertiliser, ammonia and petrochemical industry; as fuel for power generation, iron and steel industry, cement and ceramics industry, paper industry and for domestic gas supply.

Natural gas offers several advantages over other fuels: cleaner firing conditions, low emissions, possibility of quiet combustion, easy automation of integrated firing/process system, flexibility in firing conditions, efficient combustion at very low as well as high firing rates, rapid heating rate, precise controllability of firing conditions, easy equipment maintenance, reliable and secure delivery by pipeline, etc.

Natural gas replaces naphtha as feedstock in the fertiliser and petrochemicals sector. The use of natural gas in fertiliser plants like Iffco, GSFC, Kribhco, HFC and RCF has brought about a saving of more than Rs. 400 crores annually.

RETROSPECTIVE REFUNDS : STRICTER EXCISE LAWS IN OFFING

The Finance Ministry proposes to introduce several changes in the excise laws to restrict the scope for retrospective demands and refunds of duty.

One of the changes proposed is that no retrospective demand will be raised by the Government except in cases of fraud, suppression and the like. In such cases, the Government will be able to demand duty for a period of eight years.

Retrospective refunds will be allowed by the Government only if assessments are contested and the incidence of duty has not been passed on to the consumer. It is proposed to put the onus of proof on the claimant.

However, the existing system of recovery of duty in case of final assessment of goods captively consumed, on production of chartered accountant's certificate regarding production, is not proposed to be changed.

Similarly, any adjustment of proforma or Modvat credit wrongly availed or utilised, or recovery by cash if no credit is available under Rule 65A (5) or 57-1 is also proposed to be kept outside the purview of the proposed changes.

The Ministry is also examining the possibility of scrapping the existing provision for refund of duty under Rule 173-L on duty-paid goods received for refining, reconditioning, remaking and the like.

Another important proposal being examined by the Ministry is that notifications regarding changes in the rates of duty should be issued only on the first working day of the month.

These changes are expected to bring down significantly the number of disputes regarding retrospective demands and refunds of duties which have been a sore point in the relationship between the Government and industry.

Citronella oil import ban urged

Citronella growers and oil producers of the north-eastern region have strongly demanded imposition of a ban on import of "Java citronella oil."

The representatives of citronella growers and essential oil producers of the region, at a recent meeting organised by the Directorate of Industries of Assam, expressed concern over a move taken by a section of Bombay-based buyers against banning of import of the oil from foreign countries.

They urged the State Government to "convince" the Centre to impose a "total" ban.

More than 35,000 tribal and non-tribal families of the region are earning their livelihood through the industry.

The representatives said out of the total demand of 500 tonnes of Java citronella oil in the country, the annual production was about 400 tonnes. Of this the north-eastern region contributes about 350 tonnes, which can further be increased with Governmental assistance and motivation in the hilly areas

The soil and climatic condition of the region was suitable for growing Java citronella grass, lemon grass and other oil bearing grasses, they said

The Regional Research Laboratory at Jorhat has taken steps to popularise and expand production of Java citronella grass scientifically in Assam and adjoining States. There are more than 25,000 families growing citronella in the State and more than 35 distillation units are engaged in producing the oil. Besides, the Assam Hills Small Industries Development Corporation has also taken up an expansion programme of citronella cultivation for the benefit of a large number of tribal families of the two hill districts of the State, it said.

Meanwhile, Karbi citronella growers of Rangchali area of Karbi Anglong district in Assam recently submitted a memorandum to Mr K. R. Narayanan, Union Minister of State for Science and Technology, who visited the farm last month, to ban import of citronella oil to protect the interest of the indigenous growers.

The State Government was taking up the issue with the Centre to ban import of citronella and other essential oils, an official report added.

PTFE PRODUCTION IN HFL BEGINS

Hindustan Fluorocarbons Ltd (HFL) has commenced production of poly tetra fluoro ethylene (PTFE) at its Rudraram unit in Medak district which was fully commissioned in July this year. While power cut and initial technical problems took sometime for production to stabilise, different grades of PTFE produced at the plant were found to be of international standards and well accepted.

Addressing the 4th annual general meeting of the company, Mr. H. Krishnamurthy, Director, stated that with anticipated commercial production from this month onwards, a turnover of Rs. 600 lakhs will be achieved in the five months ending 31st March, 1988.

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Green signal for alcohol export

After much double talk and denials, the Government has finally taken a policy decision in favour of export of industrial alcohol, it is reliably learnt.

The Government has asked the State Trading Corporation (STC) to take steps to export 200 lakh litres of alcohol from UP. Maharashtra, another alcohol-surplus State, is also in the running.

The STC had sounded potential buyers in Europe and the US sometime ago, but was disappointed to find that there were no takers at the price of Rs. 3.50 per litre it had asked for. The international price ranges from $ 180 to $ 200 per kilo litre.

The STC is said to have passed on the task of finding buyers at a good price to the All-India Distillers Association (AIDA), who have all along been lobbying for export. However, it is highly improbable that exports will turn out to be a profitable venture.

This is because at $180 to $200 per kilo litre (FOB Kandla), the price per litre works out to Rs. 2.60. After making allowances for transport from UP (60 paise per litre) and handling costs (20 paise per litre), the net realisation will be only around Rs. 1.80 per litre, according to industry sources in Bombay.

Meanwhile, UP has reduced the "export" pass fee from Rs. 2 to Rs. 1.25. However, this reduction has been virtually nullified by the price increase and is therefore unlikely to contribute to improved offtake from UP distilleries, sources said.

Alcohol user units apprehend that this year's drought may affect the sugarcane crop of 1988-89 season. If the Government exports alcohol, it may have to import the material soon after as happened in 1985, sources said.

Distillers point out that "export" barriers set up by various States which prevented movement of the commodity from the few surplus States to the many deficit States was not their making. As such, they are justified in seeking an export outlet in overseas markets, they said.

The only practical solution under the circumstances is to reduce the "export" pass fee to less than a rupee (between 40 and 60 paise), according to an observer. This would enable industries in deficit States like Gujarat, Karnataka and West Bengal to lift supplies from the surplus States, he said.

Distillers in Maharashtra are in a dilemma. On the one hand, they are tempted to hike the price like their counterparts in UP. At the same time, a section of the distillers think this would be a ruinous step as the consuming industry would not be able to absorb any price increase.

Sources in the chemical industry regretted that when the Government is considering reduction of prices for feedstocks like naphtha and methanol, alcohol should receive a different treatment.

Some industrialists are of the opinion that the potable liquor sector should be given five years to develop alternative routes, after which the entire molasses alcohol should be reserved for industrial use. Alcohol-based industry calls for smaller investment as compared to petroleum-based industry, it was pointed out.

India is the world's largest producer of alcohol. The country will have to continue to import crude. Under the circumstances, exploitation of non-petroleum sources such as alcohol, wherever possible, is in the country's interest, sources said. Unlike petroleum, alcohol is a renewable resource, they emphasised.

Using alcohol as a feedstock for organic chemicals and polymers has various advantages like rural development, energy efficiency, smaller investment, wide dispersion of units and the wide variety of products possible from alcohol.

In a memorandum to the Union Government, alcohol-based industry has pointed out that "almost all petrochemicals based on naphtha/gas can be made by alcohol route. End-products like SBR, synthetic rubber for tyre and non-tyre sectors, NBR, a speciality oil resistent synthetic rubber and plastics like LDPE, PVC, polystyrene etc. are already made in the country. Synthetic fibres like polyester can also be made from alcohol. In addition, pharmaceuticals for public health and pesticides are also made from alcohol."

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Duty sops under modvat criticised

The Indian Council for Small Industries (ICSI) feels that the Union Government's decision to extend duty concessions under Modvat is a flawed one.

Mr. S. S. Singhania, President, ICSI, said in Calcutta on 5th November that even at a time when the Customs and Central Excise Advisory Council (CCEAC) was meeting to discuss the duty concessions, the Government conveyed to private parties its decision to extend such concessions. Was this an irregularity committed by the Government at the behest of the lobbies of large industries, Mr. Singhania asked.

He said the proposals for the extension of fiscal reliefs had been incorporated into the agenda of the CCEAC meeting at the insistance of the Federation of Indian Chamber of Commerce and Industry (FICCI), and not by any representative of the small-scale units.

As per Modvat, SSI units opting for Modvat reliefs were eligible to pay a minimum of five per cent duty and the buyer would get a set-off of 10 per cent against purchases made from a small unit. This was introduced to boost trade between large and small units. However only about 5,000 out of a total 16 lakh units have been benifited under this scheme, he added.

The value of purchases by the large industries amounted to Rs. 10,000 crores against a total gross output of Rs. 61,000 crores by the small-scale units. The fact that only 1.6 per cent of the total output was taken by the large units showed that the majority of the small units remained unaffected by the scheme under Modvat, while the large industries reaped substantial benefits by way of set-offs, Mr. Singhania said. According to him, the objectives of the scheme to encourage sales had failed miserably. Moreover the concessions availed by the large firms had not been passed on to the consumers. On the other hand the scheme had increased the financial burden of the seller whereas it had boosted the working funds of the buyer.

In fact ICSI favoured the immediate withdrawal of this scheme because it had encouraged the setting up of fictitious SSI units by the larger firms and deriving enormous savings in duties, resulting in negative realisation of duties by the Government. About 90 per cent of the small units were being pushed out of operation, it said.

ENVIRONMENT PROTECTION 'A NEED, NOT AN OPTION'

The two-day national conference on "Pollution control and monitoring technologies" discussed 15 key issues affecting industrial development on the lines desired by the Centre. After a four-hour discussion, the conference, presided over by Mr Aloke Mookerjea, Chairman, national committee of the Confederation of Engineering Industries (CEI) on environment and occupational health, unanimously adopted all the issues placed before the seminar.

The Chairmen of the State Pollution Control Boards of Tamil Nadu and Karnataka, Mr. Gangadhar Jas and Mr. S. Hanumantha Rao, respectively, attended the concluding sessions and endorsed the recommendations. These recommendations would be forwarded to the Centre for its consideration, Mr. Mookerjea later told THE HINDU.

Working together :

Explaining the issues, Mr. Mookerjea reminded the industrialists that environment protection was a need and not an option. It was up to them to decide what price they were willing to pay for such protection. It was essential for all Government agencies and the industrial sector to work together in protecting the environment by enforcing pollution control measures. It was a common and joint responsibility. This would also help maintain ecological balance.

In this context, he said the Environment (Protection) Act 1986, was an indicator of the realities which they had to face. In short, environment management was a valuable tool for resource management and environmental conservation. These could be conveniently and advantageously woven into any development project.

Continuous dialogue :

Several aspects of the Act were discussed in detail and the consensus was for a continuous dialogue between the industry and the Pollution Control Boards. Efforts should be made to bridge the gaps in the flow of information and communication techniques at all levels in a corporate unit.

It was agreed the CEI could act as the nodal agency and clearing house for information on pollution control technologies and equipment availability. Simultaneously, it should continue with its thrust on creating awareness on environmental control and prevention of pollution. Pollution control was not the end of a pipeline activity. The processes required to be reviewed. Innovation and improvement must begin with the process itself.

This was specially true in technologies to control water and air pollution. At the same time, the CEI felt that there was greater need for close interaction among consultants, users and manufacturers of pollution control and environmental protection equipment and machinery. Steps should be taken to strengthen the manufacturing base for these equipment, and the CEI agreed to extend this vital support to the manufacturers.

Some of the key areas to which the manufacturers must devote greater attention include adequate quality, proper service and maintenance, and constant innovation. In all these efforts financial Institutions had a big role to play, by providing adequate finances at reasonable rates of interest. The CEI was also aware of the need to provide expert advisory services for the benefit of small and medium industries. At the regional level, all advisory panels would be operational and would advise industrial units to use pollution control technologies judiciously ensuring their own cost effectiveness.

There was also a clear and important role for the Bureau of Indian Standards, consultants, testing laboratories and academic bodies like IITs, in disseminating information and awareness on pollution control. "Good environment management is sound business sense," Mr. Mookerjea said.

Fiscal incentives :

The CEI will also approach the Centre for fiscal incentives to setting up environmental protection equipment and pollution control machinery, Mr. Mookerjea said.

COMPANY NOTES

Polychem Limited

The following are extracts from the Chairman's Speech :

Production and Sales :

Production and sales of the three major products of the Company, namely polystyrene, styrene and vinyl acetate monomer (VAM) were more or less the same as in the previous year. There was no increase due to the Government import policy which permitted imports of these products and the emulsions based on VAM under open general licence (OGL) affecting adversely the capacity utilisation of the respective plants. As a matter of fact, to meet this competition and maintain the sales of these products at a reasonable level, sales prices had to be reduced and substantial discounts had to be offered.

The increase in total sales turnover to Rs. 65.4 crores during the year under report compared to Rs. 57.4 crores (both including excise duty) in the previous year was primarily due to steep rise in the sales of ABS (47%) and potable liquors (56%).

Profitability

I am however pleased to report that since last 2/3 months, the CIF prices of competing products are hardening and thei. availability is also becoming uncertain which has led to improved sales of our products. The VAM based emulsions which were imported under OGL have now been shifted to Appendix 3 and this change is likely to increase the demand for indige-

. . **Perspective plan for the Petrochemical Industry**

The Committee which was appointed by the Government of India under the Chairmanship of Shri D. V. Kapur has drawn out a long term perspective plan for the balanced growth of the petrochemical industry. It is being increasingly recognised and accepted that petrochemicals have an important role in supplementing natural and traditional materials and is providing the basic needs of food, clothing and shelter for teeming millions.

For plastics, the Committee estimates the demand to increase from 790,000 tons in 1989-90 to about 2,600,000 tons in the year 2000 i.e. a growth of more than 300% over a period of about 10 years. While this may appear highly ambitious, it is not difficult to achieve if given the right policies and conditions. The Committee therefore has made several important recommendations. Those which require urgent implementation are:

1. The price of feedstock, namely, naphtha/gas may be fixed at the same level as fixed for production of fertilisers.

2. Fuel oil/LSHS price is brought at par with that charged for fertiliser production.

3. The excise duty on polymers which varies from 30 to 40% may be brought down to the minimum level of 15% of the basic value.

4. While continuing with policy of OGL, the import duties may be so rationalised as to bring the landed cost of various products reached after implementing (1) (2) and (3) above.

5. A standing committee should review both the policy regarding imports as well as import duties to be modified from time to time depending on changing international situation.

Individual industries and their Associations have been suggesting such actions on the part of the Government since long but with little or no impact. However, now that the high power Committee appointed by the Government has also made similar recommendations, it is hoped that their recommendations will receive urgent consideration of the Government.

In addition to the Kapur Committee's above recommendations, it is essential to simplify licensing formalities, expand the list of industries for broad-banding and minimum economic size as well as encourage import of cost-effective modern technologies.

Failing this, the growth envisaged above will only remain a dream and the grandiose plans being made for setting up several petrochemical complexes in the country are likely to remain only on paper.

The recently passed Environment Act and the Supreme Court judgement implying "zero risk" and unlimited liability concepts for industries are impractical. These need to be reviewed on an industrywise basis. In addition, the risks arising from such hazards should be adequately covered by insurance policies. For this the Government should discuss with the nationalised insurance companies and the industries to work out a comprehensive policy cover. But for such a policy cover, entrepreneurs are likely to shy away from setting up industries

New Projects : —

Encouraged by the ambitious perspective Plan drawn out by Kapur Committee, the Company has applied for grant of letters of intent for the following two large projects in line with the minimum economic size for these products as downstream units of the proposed Gujarat Petrochemical Complex.

- a. Styrene
  Polystyrene & Copolymers
- b. Propylene Oxide
  Propylene Glycol
  Polyols
  Polyurethane Foams

Unfortunately the Government has not taken a final decision on setting up the cracker and the various downstream units, though nearly two years have elapsed. The Company is anxiously awaiting the sanctions of the Government on the above two projects based on its review representation.

EXPANSION PLANS :

Steps are in progress

1. To expand the ABS plant capacity from 200 TPA to 5000 TPA.

2. To implement the Letter of Intent to manufacture 2000 TPA of Polyvinyl Alcohol.

3. To modernise the Styrene plant which will augment its capacity to 15,500 TPA.

4. The Company has also plans to expand the capacity of its VAM plant to 15,000 TPA.

The estimated cost of all these projects is about Rs. 35 to 37 crores.

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Address by Mr. K. S. Narayanan, Chairman.

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The current year marks the completion of twenty years of operations of the Mettur Dam Plant, and twenty five years of existence of the company. The company continues to maintain performance at peak levels, and results for the year should again make satisfying reading.

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There is at present a world shortage of PVC, and international prices have firmed up considerably, with supplies difficult to come by. The step-motherly attitude adopted towards the Indian PVC industry all these years has constrained its normal growth, with the result that the country continues to be dependent on imported material for almost one-third of its requirements. At times like this, the effects of this dependence are sorely felt.

The Government has proposed a minimum economic capacity of 100,000 tonnes per annum for new PVC capacity, and has also directed that this capacity should be based on indigenous basic raw material inputs. This insistence on size is unrealistic in the Indian environment, where size-related advantages are more than offset by high capital costs and infrastructural difficulties. Similarly, availability of basic raw materials — Ethylene and Chlorine, can only be from large Petro-chemical crackers and electro-intensive caustic soda plants, and these take a long time to go from the drawing board to reality.

One therefore hopes that a well-thought out policy, which allows indigenous PVC manufacturers to expand in stages, based on imported inputs for the short term, would be evolved. This would be the most economic and logical way to increase availability of PVC in the country. These expanded capacities could offer in a few years, change over to locally available inputs when they are available from large petro-chemical capacities that are brought on line. Simultaneously, a policy should also be adopted to regulate the indiscriminate imports of PVC that have acted as a retardant to the growth of the indigenous industry, at the same time ensuring that the indigenous users get their full requirements of materials. We, along with the other manufacturers of PVC, have brought these matters to the attention of the authorities concerned, and it is hoped that rational decisions would be taken early.

During the year, the company brought on line its Combined Cycle Power Plant. This is probably the most outstanding example of energy conservation in the country, albeit on a modest scale. With this plant the company is not only able to meet its entire power and steam needs, but has also been able to spare some power for the neighbouring plant of Mettur Chemicals to improve its own production.

The company is setting up comprehensive Effluent Treatment facilities at the distilleries at Krishnagiri and at Panruti. You will be happy to know that the High Court of Madras has passed orders approving the amalgamation of Arvind Distillery and Chemicals Limited with the company.

The company's wholly owned subsidiaries, Urethanes India Limiten and Peroxides India Limited, are expected to go into commercial production of Thermoplastic Polyurethane and Peroxide Initiators respectively, in the next few months. The Water Treatment Chemicals division is also expected to go commercial shortly.

As part of its on-going drive for diversification, the company has acquired a controlling interest in Vioryl (India) Limited, an Export Oriented Unit manufacturing aromatic chemicals. This venture is being looked at as an entry point for your company into the whole range of fine chemicals, which by the very nature, are high added value products.

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3.	MMG-4/B.Tape/87	Bopp Base Self Adhesive Tape	3000 Reels of 65 Mtr. each
4.	P-718/M/87	SST. Electrods 10 SWG	12000 Nos.
5.	P-713/M/87	Mafron-22 Gas filled Cylinders each containing 61 kgs. net weight of Gas	20 Nos.
6.	P-457/Spares/87	Beval Gear for Italian Gear Boxes	4 Sets
7.	MMG-4/FD/(S)/87	FIBRE DRUMS	9000 Nos.

Tender documents alongwith specifications can be obtained till 21.11.87 on payment of Rs. 100.00 each for all items in cash/Indian Postal Orders in favour of M/s. Indian Drugs & Pharmaceuticals Ltd. Virbhadra from Accounts Executive (Cash).

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SPOTLIGHT ON

Biotechnology & Life Sciences (Part 2)

PLANT GENETIC SYSTEMS PLANS FOR THE WORLD'S FIRST COMMERCIALIZATION OF INSECT-RESISTANT PLANTS

Plant genetic systems (PGS) the Belgian biotech firm is negotiating with USA plant breeders to establish arrangements to commercialise insect-resistant plants. Researchers at the PGS have developed genetically altered tobacco plants that are resistant to attack from insects.

The researchers have cloned sub-fragments from the bacterium Bacillus thuringiensis (varberliner) coding for the insecticidal delta toxin and inserted them into plants using vectors based on the tumour-inducing plasmid of Agrobacterium tumefaciens. Plants carrying the genes were found to be resistant to tobacco hornworm larvae.

Marc Van Montegu, research team leader, and his colleagues are now screening other varieties of the bacterium to find toxins that can kil- other pests. 'Although plant breeders in Mexico and USA have shown interest in the tobacco resistance, we are now looking at a variety of other crops including cotton, coffee and fruit plants' Van Montagu explained.

PGS entered into an agreement last June with the USA based Ecogen to screen B. thuringiensis varieties for other toxic protein that are specific killers of other commercially destructive pests.

Spore preparations of the bacterium have been used for more than two decades as biological pesticides but their commercial use has been limited by high production costs and the instability of the crystal proteins when exposed in the field. Transfer of genes into the plant may provide a more effective means of pest control, the Belgian researchers concluded. (*ECN* 7/20/87 p. 18)

A US PATENT ISSUED FOR GENETICALLY-ENGINEERED HYBRID MOLECULES

The US Patent & Trade Mark Office has issued a broad patent to John Murphy, Chief of Biomolecular Medicine at University Hospital, Boston, USA, for genetically engineered hybrid molecules used in the treatment of autoimmune diseases and cancer. Seragen company of Hopkinton, Mass. has exclusive rights to the technology.

The patent covers a family of hybrid molecules based on a portion of diphtheria toxin made specific by replacing its non-specific binding region of a hormone or growth factor specific for targeted cells. (*ECN 7/20/87 p. 18).*

NEW TECHNIQUES ON THE HORIZON FOR EXTRACTING VARIED CHEMICALS FROM ALGAE

Microalgae known as green slime to fishermen and farmers could be an important future feedstock for a wide range of process plants.

A number of companies already are marketing products extracted from algae, including food supplements and colourings, fluorescent dyes and pigments. Among other items under development are pharmaceuticals, fatty acids, fuels and polysaccharides.

Algae make up almost 70% of the world's biomass, comprising more than 10,000 types (strains) that range from microscopic single cells to giant ocean algae cells miles in length. Kelp (seaweed) has long been processed for algin agar and carrageenan, while such microalgae like Spirulina and Chlorella are harvested, dried and sold as food supplements, especially in Japan. However, the market for products extracted from microalgae is still in its infancy and the potential appears great.

'Microalgae will produce almost anything' asserts Donna Johnson, coordinator of the aquatic species programme at the Solar Energy Research Institute (SERI, Golden Colorado)'. 'The trick or a challenge is to find an organism that makes what you want and also grows well. Then you try to grow it on a very large scale, and figure out an efficient and economical extraction process'.

Microalgae operations have tended to thrive in hot arid areas, such as the Southern California desert and Israel's Negev desert, where the plants can grow year-round, land is cheap and brakish water is available for cultivation. Many regions of Rajasthan, Kutch and Saurashtra provide similar environment for good cultivation of microalgae. But algae has received scant attention in India so far. We can learn a lot from Israeli experience in this field, but our politics prevents us from moving further in this direction. In contrast researchers in several countries (such as Israel, Japan, USA, South Korea) are working to raise the growth rate of useful strains of microalgae that make a host of products, including fuels, polysaccharides and drugs.

GENETIC ENGINEERING OF ALGAE -- AN UPDATE

Genetic engineering of algae has great potential, but is still in its infancy. A number of organizations in Japan and USA are working on cell fusion techniques.

One of these is Bio-Technical Resources (Manitoivoc, Wis) which hopes to incorporate cell-fusion technology with a heterotrophic (i.e. requiring organic compounds of carbon and nitrogen for metabolic synthesis) system it is developing. So far, the company has used classically mutated algae strains to reach production of up to 100 gm/litre in a heterotrophic set up, using carbohydrates -- e.g. glucose -- as carbon source.

It is reported that doubling times are as low as 5 hours. The purpose of this research is to find algae that can grow heterotrophically and produce substances not made by yeast or bacteria. Fermentation equipment and substrates may seem expensive at present but the company's researchers believe the economics favour heterotrophic technology (*Chem. Eng.* 5/11/87) p. 22).

GENETICS INSTITUTE DEVELOPS A NOVEL TPA

Scientists at Genetics Institute in Cambridge, Massachusetts have developed a novel form of the blood-clot busting drug, tissue plasminogen activator (tpa). According to the company, the new variant stays in the blood-stream for longer periods and can be administered in a single more effective dosage than the first generation tpa.

Glen Larsen, head of the research team that developed the variant, reports that animal studies have demonstrated that it stays in circulation significantly longer than the natural form. This characteristic simplifies administration of the drug and could reduce the frequency with which clots recur.

Genetics Institute has applied for patents on the drug and at present retains all rights for commercialisation. After further pre-clinical studies, the company plans to begin clinical trials in 1988. (*ECN* 7/20/87 p. 12).

COMMERCIAL PRODUCTION OF B-CAROTENE FROM MICROALGAE ON THE HORIZON

Carrots in future will not be the only major source of B-carotene, since biotech researchers are on the verge of developing a commercial production of B-carotene by using microalgae on a big scale. B-carotene, a precursor of Vit. A, now sold as a health food supplement in affluent countries, is shortly going to be extracted economically from microalgae.

Among the producers are Microbio Resources Inc. (San Diego, Calif.), Cyanotech Corp. (Woodinville, Washington), Australia's Betatene Ltd. (Cheltenham, Victoria) and Western Biotechnology Ltd. (Bayswater, Western Australia), Israel's Kior Foods Ltd., has a pilot plot in Haifa and is considering going commercial.

These firms' source of raw material is Dunaliella Salina, a green alga that produces 5-10% of its weight in beta carotene (B-Carotene), versus 0.1% for carrots, the only other natural source. A typical production unit is a one-acre, oval-shaped shallow pond, with a central divider stretching most of its length. Nutrients are added and carbon dioxide is sparged in to optimize growth and B-carotene output. A paddle wheel maintains steady circulation around the divider.

'In spring, the biomass population doubles daily, but when it is cool it might take 5 days' reports Thomas Naylor, plant manager at Microbio's plant facilities in Calipatra, California.

Producers typically pump the algae into a process plant, add flocculant to agglomerate the biomass, dewater by centrifugation and filtration, then return the water to the pond. Microbio then stabilizes B-carotene in corn oil, and separates this from the solids, obtaining a 1.4% or 3.5% carotene-in-oil concentration. Australia's Betatene and Western Biotechnology also make carotene-in-oil products.

Cyanotech, whose ponds are in Kailua-Kona, Hawaii uses a fresh water wash to extract B-carotene from the biomass. 'When the salinity drops, the cells literally burst because of the osmotic pressure' reports Gerald Cysewski, executive vice president of Cyanotech. The company obtains B-carotene in the form of a dry powder.

An exception to intensive cultivation is Betatene's project, which has a 250 acre lake, adds no carbon dioxide and has a simple proprietary extraction process. Relatively low B-carotene concentration is offset by lower costs, reports Malcom Taylor, Managing Director.

Biogenics Inc. (Santa Cruz, Calif) plans to patent a process to extract carotenes from Spirulina. In tests at Harward University and elsewhere, the carotenes seem to enhance the immune system and help destroy cancer cells. (*Chem. Eng.* 5/11/87 pp. 19-21).

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A PROPRIETARY PROCESS UNVEILED TO PRODUCE EICOSEPENTAENOIC ACID FROM ALGAE

Cyanotech Company (Woodenville, Wis) has isolated and identified a microalgae which produces Eicosepentanoic acid (EPA) in extractable quantity. The nature of this microalgae is a proprietary secret and therefore not revealed. The EPA at present is obtained from fish, certain liver oils such as cod liver oil, shark liver oil etc. and is very expensive.

The Company is developing a process to extract EPA from this proprietary microalgae. The yield may be raised in future by genetic engineering to produce EPA at a much lower cost to make possible extensive use of EPA in medicine. EPA reputed finds use in reducing blood cholesterol and the risk of heart disease. (*Chem. Eng.* 5/11/87 p. 21).

RESEARCH FUNDED TO DEVELOP FOOD COLOURS & FLUORESCENT PHYCOBILIPROTEINS FROM ALGAE

In recent years biotech researchers are turning their attention to algae for producing food colours and fluorescent proteins from algae.

Western Biotechnology (USA) researchers are active in the field for producing food colours. The Company has a patent pending on a process to extract phycocyanin (a blue pigment) from Spirulina. It also has signed a contract to supply the pigment to Dainippon Ink & Chemicals Inc. (Tokyo, Japan). Dainippon is a phycyanin producer for food colouring.

Western Biotechnology does intensive cultivation of Spirulina on fine 12-acre ponds. It has a three year $4 million contract to sell 30% concentrated product to Nihon Siber Hegner Ltd. (Tokyo) for food colouring.

Fluorescent phycoproteins are being obtained from various algae for use as tracers in clinical testing and research. First, alga cells are disrupted by pressure, high-speed blending or enzymes, reports Jose' Perdomo, President of Biomeda Corporation (Foster City, Calif.), which incorporates phycobiliproteins in test probes. Solids are then separated by centrifuge, and the supernatent containing phycobiliprotein is purified by biophysical means.

Cyanotech, which also produces phycobiliproteins, breaks the cells with ultrasound or a rapid freeze/-thaw cycle, adds salt to the broth to precipitate proteins (which are separated by centrifugation), and finally uses gel filtration.

The firm has signed on agreement with American Cyanamid Co.'s Lederle Laboratories (Wayne, N.J.) to commercialize the technology. (*Chem. Eng.* 3/16/87 p. 20) (*Chem. Eng.* 5/11/87 p. 10).

PRODUCTION OF HYDROCARBONS, LIPIDS & WAXES FROM ALGAE UNDER STUDY

Production of gasoline and diesel fuels from microalgae is the goal of a U.S. Department of Energy programme managed by SERI. So far SERI has defined 39 promising strains that produce up to 60 % lipids (dry weight) with growth rates of up to 50 gm/m^3 per day. The researchers have done very little to date on process technology but in 1987 the DOE programme will take up one or two projects to look at extracting the lipids and converting them to fuel.

A strain of Botryococcus braunti that secretes hydrocarbons throughout its growth period recently earned as a plant patent for the University of California (Berkeley), which is interested in commercialising it for fuel production.

Harima Chemicals Inc. (Osaka) which is developing a process that uses the alga Euglena to make unsaturated wax from tall fatty acid has increased wax yield from 10 g/litre to 30 g/litre, but this yield is 'still inadequate and uneconomical' says a Harima research manager. The Company recently teamed up with an unidentified cosmetics manufacturer for joint commercialization and has scaled up to a 50-litre cultivation tank at its Kokogawa research centre.

Israel's Oceanographic and Limological Institute (Haifa) is working with Isochrysis for production of fatty acids. The alga currently produces lipids at 10-30% of its weight reports Ami Ben Amotz, head of the microbilogy department, a noted authority on algae. He is also working on a number of other projects including Koor's Dunaliella/beta carotene process. (*Chem. Eng.* 8/18/87 p. 11) (*Chem. Eng.* 5/11/87 p. 21).

A COMPUTERIZED MICROBIAL CULTURES INFORMATION SERVICE MOOTED IN BRITAIN

In the UK National Culture Collection are maintained over 30,000 organisms, most of which have never been considered by chemists or a potential source of valuable and versatile catalysts.

By 1988, the information on this key biotechnical resource will have been computerized and will be available through the Microbial Cultures Information Service (MiCIS) which has been set up at the Laboratory of the Government Chemist. (*Lab Practice* 7/1987 p. 46).

A MINIATURE SHOT GUN DEVICE TO BLAST GENE FRAGMENTS INTO THE CELLS OF ORGANISMS DEVELOPED

A new miniature shotgun device that can blast gene fragments into the cells of living organisms has been developed in the United States. The gun device delivers genetic materials to thousands of plant cells with one blast much more efficiently than any other means known.

'The gun can greatly help man in engineering new forms of life' reports Theodore Klein of Cornell University, Ithaca, New York. He has already successfully used the device to fire foreign genetic materials into living onion cells to manufacture new proteins. According to Klein, this unique gun device can be used to develop improved strains of food crops, such as rice, wheat and maize. Together these are the world's three most important food crops. (*Span* 9/1987 p. 38).

AN ADVANCED SYSTEM FOR CAPTURING OFF-GAS FROM FERMENTATION

A new system developed by Domnick Hunter Folters (Butley, UK) has been developed to prevent the escape of microorganisms to the atmosphere and to reduce or eliminate foam aggregates and aerosols in the off-gas from fermenters.

The key piece of equipment is a gas-liquid separator that uses an arrangement of blades to remove entrained liquid droplets and break down protein foams. The liquid can be returned to the fermenter or piped to separate containment. The complete system also incorporates exit-gas sterilization and humidity control.

The unit, trade-marked 'Turbosep' is marketed in USA by Domnik Micro-Filtration (Charlottesville, Va). (*Chem. Wk.* 8/12/87 p. 17).

In Brief

* Rhone-Poulenc is merging its two Spanish agrochemicals subsidiaries, Condor and Serpiol into a new company, Rhone-Poulenc Agroquimica. Headquartered in Madrid, the unit's main production base is at Cheste, Valencia with R & D facilities at Torre de la Reina, Seville. Products will continue to be marketed under the Serpiol and Condor trademarks.

* Knoll Pharmaceuticals, the BASF drugs subsidiary, has commissioned a DM14m ($7.67m) plant for the production of tablets at Whippany, New Jersey. The company said the move represents a doubling of capacities at the site. Knoll reported US sales of $120m in 1986.

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Chlorine Utilisation

V.K.M. MENON
Executive Director, Alkali Manufacturers' Association of India, Bombay

(Continued from the previous issue)

MAJOR USES OF CHLORINE
PRODUCTION OF ORGANIC CHEMICALS

Ethylene Dichloride (EDC)

Vinyl chloride; solvent; lead scavenger in antiknock gasoline; paint, varnish and finish removers; metal degreasing; soaps and scouring compounds; wetting and penetrating agents; organic synthesis; ore flotation.

Amyl Chloride (1-chloropentane)

Pentenes. Gasoline blending agent; tertiary amyl phenols; granular soil pesticide; polymerization inhibitor.

Chlorofluoro Hydrocarbons

Refrigerants and aerosol propellants.

Trichlorofluoromethane (11)

Solvent, fire extinguishers; refrigerant; air conditioning; chemical intermediate, blowing agent.

Dichlorofluoromethane (12)

Fire extinguishers; solvent; refrigerant, aerosol propellant.

Chlorodifluoromethane (22)

Refrigerant; low-temperature solvent; fluorocarbon resins, especially tetrafluroethylene polymers.

1,1,2-Trichloro-1,2,2-trifluoroethane (113)

Dry cleaning solvent; fire extinguishers; refrigerant; air conditioning units; to make chlorotrifluoroethylene; blowing agent; polymer intermediate; solvent drying; drying electronic parts and precision equipment.

1,2-Dicloro-1,1,2,2-tetrafluoroethane (114)

Solvent; fire extinguishers; refrigerant and air conditioner; aerosol propellants; blowing agent; dielectric fluid.

Carbon Tetrachloride

Refrigerants and propellants, especially the chlorofluorohydrocarbons; metal degreasing; agricultural (grain) fumigant; chlorinating organic compounds; production of semiconductors; anthelmintic, rodenticide; solvent for oils and fats.

1,1,1-Trichloroethane (methyl chloroform)

Cold cleaning of metals and other materials; vapour degreasing; pesticide; synthesis of vinylidene chloride.

1,1,2-Trichloroethane

Solvent for fats, oils, waxes, resins, other products; organic synthesis.

Trichloroethylene

Metal degreasing; extraction solvent for oils, fats, waxes; solvent dyeing; dry cleaning; refrigerant and heat exchange liquid; fumigant; cleaning and drying electronic parts; diluent in paints and adhesives; textile processing; chemical intermediate; aerospace operations (flushing liquid oxygen).

Perchloroethylene (tetrachloroethylene)

Dry cleaning (dry cleaning, processing and finishing in textile industry); solvent in metal cleaning; manufacture of fluorocarbons; drying agent for metals and certain other solids.

Methyl Chloride

Catalyst carrier in low-temperature polymerization (butyl rubber); tetramethyl lead; silicones; refrigerant; medicine; fluid for thermometric and thermostatic equipment; methylating agent in organic synthesis --such as methyl cellulose; extractant and low-temperature solvent; propellant in high pressure aerosols; herbicides.

Phosgene

Organic synthesis, especially of isocyanates, polyurethane and polycarbonate resins, carbamates, organic carbonates and chloroformates; pesticides; herbicides; dye manufacture.

Methylene Chloride

Paint remover; propellant for aerosol sprays; solvent degreasing plastics processing; blowing agent in foams; solvent extraction.

Chloroform

Fluorocarbon refrigerants and propellants; fluorocarbon plastics; solvent; analytical chemistry; fumigant; insecticide.

Ethyl Chloride

Manufacture of tetraethyl lead and ethyl cellulose; anaesthetic; organic synthesis, alkylating agent; refrigeration; analytical reagent; solvent for phosphorous, sulphur, fats, oils, resins and waxes; insecticides.

Allyl Chloride

Preparation of allyl alcohol and other allyl derivatives, thermosetting resins for varnishes, plastics, adhesives; synthesis of pharmaceuticals, glycerol, and insecticides; precursor for epichlorohydrin.

Epichlorohydrin

Major raw material for epoxy and phenoxy resins; manufacture of glycerol; curing propylene-based rubbers; solvent for cellulose esters and ethers; high wet strength resins for paper industry.

Chlorosulphonic acid

Synthetic detergents; pharmaceuticals; dyes; pesticides; intermediates; ion exchange resins; anhydrous hydrogen chloride and smoke-producing chemicals.

Chloroprene

Manufacture of neoprene.

Chloroanthraquinone

Starting material for certain vat dyes.

Chloroanilines

Dye intermediate; pigments; pharmaceuticals; agricultural chemicals.

Dichloropropane (propylene dichloride)

Intermediate for perchloroethylene and carbon tetrachloride; lead scavenger for antiknock fluids; solvents for fats, oils, waxes, gums and resins; solvent mixtures for cellulose esters and ethers; scouring compounds; spotting agents; metal degreasing agents; soil fumigant for nematodes.

Dichloropropenes

Soil fumigants.

Methallyl Chloride

Intermediate.

Chlorinated Paraffins

High pressure lubricants; lubricant additives and paints; flame retardant in plastics and textiles; as plasticizer for polyvinyl chloride in polyethylene sealants; detergents.

Chlorinated Waxes

Moisture, flame, acid and insect-proofing of wood, fabrics, wire and cable; solvent.

Chlorinated Naphthalenes

Electrical industry-insulating compositions for electric cables; wood, paper and textile coating.

Chloroacetic Acid

Herbicide; preservative; bacteriostat; intermediate in production of carboxymethylcellulose, ethyl.

2,4-Dichlorophenoxyacetic acid (2,4-D)

Selective weed killer and defoliant.

2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)

Plant hormone; herbicide; defoliant.

Chloroacetyl Chloride

Preparation of chloroacetophenone; intermediate; tear gas (chloroacetophenone).

Chlorobenzene

Phenol, chloronitrobenzene; aniline; solvent carrier for methylene di-isocyanate; solvent; pesticide intermediate; DDT.

Dichlorobenzenes

Meta - Fumigant and insecticide.

Ortho - Manufacture of 3,4-dichloroaniline; solvent for organic materials and for oxides of nonferrous metals; solvent carrier in production of toluene di-isocyanate; dye manufacture fumigant and insecticide; degreasing hides and wool; metal polishes; industrial odour control.

Para - Moth repellant; general insecticide; germicide; space odorant; manufacture of 2,5-dichloroaniline; dyes; intermediates; pharmacy; agriculture (fumigating soil).

Trichlorobenzene

Organic intermediate; solvent in chemical manufacture; dyes; dielectric fluid; synthetic transformer oils; lubricants; insecticides; heat-transfer medium.

Tetrachlorobenzene

Intermediate for herbicides and defoliants; insecticide; impregnant for moisture resistance; electrical insulation; temporary protection in packing.

Benzene Hexachloride

Insecticides.

Chlorotoluene

Solvent and intermediate for dyes and organic chemicals.

Benzyl Chloride (Alpha Chlorotoluene)

Dyes, intermediates; benzyl compound -- n-butyl benzyl phthalate, benzyl alcohol, quarternary ammonium compounds, benzyl acetate, etc.; synthetic tannins; perfumery; pharmaceuticals; manufacture of photographic developer; gasoline gum inhibitors; penicillin precursors.

Hexachlorothane

Organic synthesis; retarding agent in fermentation; camphor substitute in nitrocellulose; rubber accelerator; pyrotechnics and smoke devices; solvent explosives.

Chlorophenol

Intermediate in organic synthesis (dyes); paradenaturant for alcohol; selective solvent in refining mineral oils.

Chloral

Manufacture of chloralhydrate and DDT.

Hexachlorocyclopentadiene

Intermediate for resins, dyes, pesticides, fungicides, pharmaceuticals.

Perchloromethyl Mercaptan

Organic synthesis; dye intermediate; fumigant.

Tetra Chlorophthalic Anhydride

Intermediate in dyes, pharmaceuticals, plasticizers, and other organic materials; flame retardant in epoxy resins.

Monochlorobenzene

Phenol, aniline and DDT insecticide.

Monochloroacetic acid

Manufacture of carboxymethyl cellulose; herbicide; detergents, pharmaceuticals/permanent wave solutions.

Vinyl Chloride

Polyvinyl chloride and co-polymers; organic synthesis; adhesives for plastics.

Polyvinyl chloride

Construction, consumer goods, packaging, electrical uses, transportation, home furnishings.

Propylene oxide

Manufactured by reacting an alkali with propylene chlorohydrine (made from propylene,. chloride and water); used as a chemical intermediate to produce polyglycols for manufacture of urethane foams and resins; used to produce propylene glycol and dipropylene glycol for production of polyester resins, as a solvent in pharmaceutical and food formulations, as a plasticizer for films, and as a humectant; used to produce polyglycol ethers; used in lubricants and hydraulic fluids; used in nonionic surfactants; fumigants; solid sterilants; isopropanol amines; synthetic elastomers and synthetic lubricants.

Ethylene oxide

Manufactured by reacting an alkali with ethylene chlorohydrine (made from ethylene chloride and water); used in manufacture of ethylene glycol/higher glycols; surfactants; acrylonitrile; ethanol amines; petroleum deemulsifier; fumigant; rocket propellent; industrial sterilant.

PRODUCTION OF INORGANIC CHEMICALS

Sodium Chloride

Oxidizing agent and bleach (especially to make chlorine dioxide) for paper pulps; herbicide and defoliant; ore processing; medicine; substitute for potassium chlorate; matches; explosives; flares and pyrotechnics; leather tanning and finishing; textile mordant; to make perchlorates; recovery of bromine from natural brine.

Sodium Chloride

Chemical production -- sodium hydroxide, soda ash, hydrochloric acid, chlorine, metallic sodium; ceramic glazes; metallurgy; curing of hides; food preservative; mineral waters; soap manufacture; home water softeners; highway deicing; regeneration of ion-exchange resins; photography; food seasoning; feeds, herbicide; fire extinguishing; nuclear rectors; mouthwash; medicine.

Hypochlorous Acid

Textile and fibre bleaching; H_2O purification; antiseptic bleach; epichlorohydrine; caicium hypochlorite; sodium hypochlorite; lithium hypochlorite.

Chlorinated Trisodium Phosphateqqqq

Cleaner and disinfectant.

Chlorinated Isocyanurates

(Potassium dichloroisocyanurate, sodium dichloroisocyanurate, tri-chloroisocyanuric acid) sanitizers (e.g. for swimming pools); household and commercial bleaches, detergents for automatic washers; scouring powder; chlorinated cleaners.

Hydrochloric Acid

Acidizing (activation) of petroleum wells; ore reduction; steel pickling and metal cleaning, refining of tin and tantalum; general cleaning of membranes in desalination plants; alcohol denaturant, deliming agent for hides; catalyst for production of aniline by nitrobenzene reduction; latex coagulating agent; in food processing (e.g. in sugar refining, brewing industry, and for manufacture of monosodium glutamate and gelatin).

Phosphorous Trichloride

Making phosphorous oxychloride, intermediate for organophosphorous pesticides, surfactants, phosphites (reaction with alcohols and phenols), gasoline additives, plasticizers, dyestuffs; chlorinating agent; catalyst; preparing rubber surfaces for electrodeposition of metal; ingredient of textile finishing agents.

Phosphorous Pentachloride

Chlorinating and dehydrating agent; catalyst.

Phosphorous Oxychloride

Manufacture of cyclic and acyclic esters for plasticizers, gasoline additives, hydraulic fluids, and organophosphorous compounds; chlorinating agent and catalyst; dopant for semiconductor grade silicon; tricresyl phosphate and fire retarding agents.

Titanium Trichloride

Reducing agent; organic synthesis; co-catalyst for polyolefin polymerization; organometallic synthesis involving titanium; laundry stripping agent.

Titanium Tetrachloride

Pure titanium and titanium salts; mordant dye; irridescent effects in glass; smoke screens; titanium pigments; polymerization catalyst.

Ferric Chloride (by-product of titanium tetrachloride production)

Treatment of sewage and industrial wastes, etching agent for engraving, photography, and printed circuitry; catalyst mordant; oxidizing, chlorinating and condensing agent, disinfectant, pigment, medicine; feed additive, water purification.

Aluminium Chloride, anhydrous

Ethylbenzene catalyst; dyestuff intermediate; detergent alkylate; ethyl chloride; pharmaceuticals and organics (Friedel-Crafts catalyst) butyl rubber; petroleum refining; hydrocarbon resins; nucleating agent for titanium dioxide pigments.

Sulphur Monochloride

Chemicals (sulphur solvent, acetic anhydride, thionyl chloride, carbon tetrachloride from carbon disulphide, various chlorohydrins from glycerol, glycol, etc.); analytical reagent; rubber vulcanizing; vulcanized oils, purifying sugar juices; military poison gas; insecticide; hardening soft wood (by treatment with sulphur chloride dissolved in carbon disulphide); pharmaceuticals; textile finishing and dyeing; extraction of gold from its ores.

Sulphur Dichloride

In general, as a chlorine carrier or chlorinating agent; rubber vulcanizing; vulcanized oils; purifying sugar juices; sulphur solvent; chloridizing agent in metallurgy; manufacture of organic chemicals and insecticides.

Sulphuryl Chloride

Organic synthesis (chlorinating agent, dehydrating agent; acrylating agent); pharmaceuticals; dyestuffs; rubber-based plastics; rayon; poison gases; solvent, catalyst.

Mercurous Chloride

Fungicide; electrodes; pharmaceuticals.

Mercuric Chloride

Manufacturer of calomel and other mercury compounds; disinfectant; organic synthesis; analytical reagent; metallurgy; tanning; catalyst for vinyl chloride; sterilant for seed potatoes; fungicide; insecticide and wood preservative; embalming fluids; textile printing; dry batteries; photography; process engraving and lithography.

Silicon Tetrachloride

Smoke screens; manufacture of ethyl silicate and similar compounds; production of silicones, manufacture of high print silica and fused silica glass; source of silicon, silica and hydrogen chloride; laboratory reagent.

Zinc Chloride from zinc metal

Galvanizing iron; catalyst; dehydrating and condensing agent in organic synthesis; wood preservative; soldering fluxes; burnishing and polishing compounds for steel; electroplating; antiseptic and deodorant preparations (up to 2% solution) textiles (mordant, carbonizing agent, mercerizing, sizing and weighing compositions, resist for sulphur colours, albumin colours and para red); adhesives; dental cements; glass etching; petroleum refining; parchment; dentifrices; embalming and taxidermists fluids; medicine; dyestuffs; pigments; antistatic; feed additive; denaturant for alcohol; dietary supplement.

Antimony Pentachloride

Analysis (testing for alkaloids and cesium); dyeing, intermediates; as chlorine carrier in organic chlorinations.

Antimony Trichloride

Antimony salts; bronzing iron; mordant; manufacture of lakes; chlorinating agent in organic synthesis; pharmaceuticals; fireproofing textiles.

Stannus Chloride

Reducing agent in manufacture of chemicals, intermediates, dyes, polymers, phosphors; manufacture of lakes; textiles (reducing agent in dyeing, discharge in printing); tin galvanizing; reagent in analytical chemistry; medicine; silvering mirrors; revivification of yeast sown in must (accelerator); antisludging agent for lubricating oils; food preservative; stabilizer for perfume in soaps.

Arsenic Trichloride

Intermediate for organic arsenicals (pharmaceuticals, insecticides).

Bismuch Trichloride

Bismuth salts.

Chlorine Trifluoride

Incendiary; fluorinations; cutting oil well tubes; oxidizer in propellants.

Molybdenum Pentachloride

Chlorination catalyst; vapour-deposited molybdenum coatings; component of fire retardant resins; brazing and soldering flux; intermediate for organometallic compound, e.g. molybdenum hexacarbonyl.

Iodine Monochloride

Analytical chemistry; organic synthesis; pharmaceutical (antiseptic).

Iodine Trichloride

Medicine; agent for introducing iodine and chlorine in organic synthesis; pharmaceuticals.

Calcium Chloride

Dust control; deicing highways; industrial processing; concrete treatment; oil well drilling (drilling muds); dustproofing, freezeproofing and thawing coal, coke, stone, sand, ore; fungicides, refrigeration brines, drying and dessicating agent, sequestrant foods; firming agent in tomato canning; tire weighing; pharmaceuticals; electrolytic cells.

Barium Chloride

Chemicals (artifical barium sulphate, other barium salts); reagent; lube oil additives; boiler compounds; pigments; manufacture of white leather.

Cadmium Chloride

Preparation of cadmium sulphate; analytical chemistry; photography; dyeing and calico printing, ingredient of electroplating baths; addition to tinning solutions; manufacture of special mirrors; vacuum tube industry.

Cobaltous Chloride

Absorbent for ammonia; gas masks; electroplating; sympathetic inks; hygrometers; in soils and animal feeds; vitamin B12; flux for magnesium refining; solid lubricant; dye mordant; catalyst; barometers; laboratory reagent; foam stabilizer.

Cupric Chloride

Mordant.

Magnesium Chloride (from brines)

Source of magnesium metal; disinfectants; fire extinguishers; fireproofing wood, magnesium oxychloride cement; refrigerating brines; ceramics; cooling drilling tools; textiles (size, dressing and filling of cotton and woollen fabrics, tread lubricant; carbonization of wool); paper manufacture; road dust laying compounds; floor sweeping compounds; flocculating agent; catalyst.

Nickel Chloride

Electroplated nickel coatings; reagent chemicals.

Stannic Chloride

Electroconductive and electroluminescent coatings, textiles; perfume stabilization; manufacture of fuchsin; colour lakes; ceramics; bleaching agent for sugar; stabilizer for certain resins; manufacture of blue print and other sensitized papers; other tin salts; bacteria and fungi control in soaps.

Titanium Tetrachloride

Pure titanium and titanium salts; mordant dye; irridescent effects in glass; smoke screens; titaniumpigments; polymerization catalyst.

Zinc Chloride

Galvanizing iron; catalyst; dehydrating and condensing agent in organic synthesis; wood preservative; soldering flux; burnishing and polishing compounds for steel; electroplating; antiseptic and deodorant preparations; textiles (mordant, sizing etc); adhesives; dental cement; glass etchings; feed additive; petroleum refining.

Antimony Trichloride

Antimony salts; bronzing iron; mordant; manufacturing lakes; chlorinating agent in organic synthesis; pharmaceuticals; fireproofing textiles.

Arsenic Trichloride

Intermediate for organic arsenicals (pharmaceuticals insecticides).

Bismuth Trichloride

Bismuth salts.

Lithium Chloride

Airconditioning; welding and soldering flux; dry batteries; heat exchange media; salt baths; dessicant; humectant; production of lithium metal; soft drinks and mineral water to reduce escape of carbon dioxide.

Zirconium Tetrachloride

Source of the pure metal (formed as intermediate in process); analytical chemistry; water repellent for textiles; tanning agent; catalysis; zirconium compound.

Aniline Hydrochloride

Dyes; intermediates; dyeing and printing; aniline black.

Diphenylamine Dyes

Rubber accelerator; plastics stabilizer; rocket propellants, pesticides.

Amine Hydrochlorides

Pharmaceuticals.

Hydrazine Dihydrochloride

Chlorine scavenger for hydrogen chloride gas streams.

Miscellaneous (D.S. uses)

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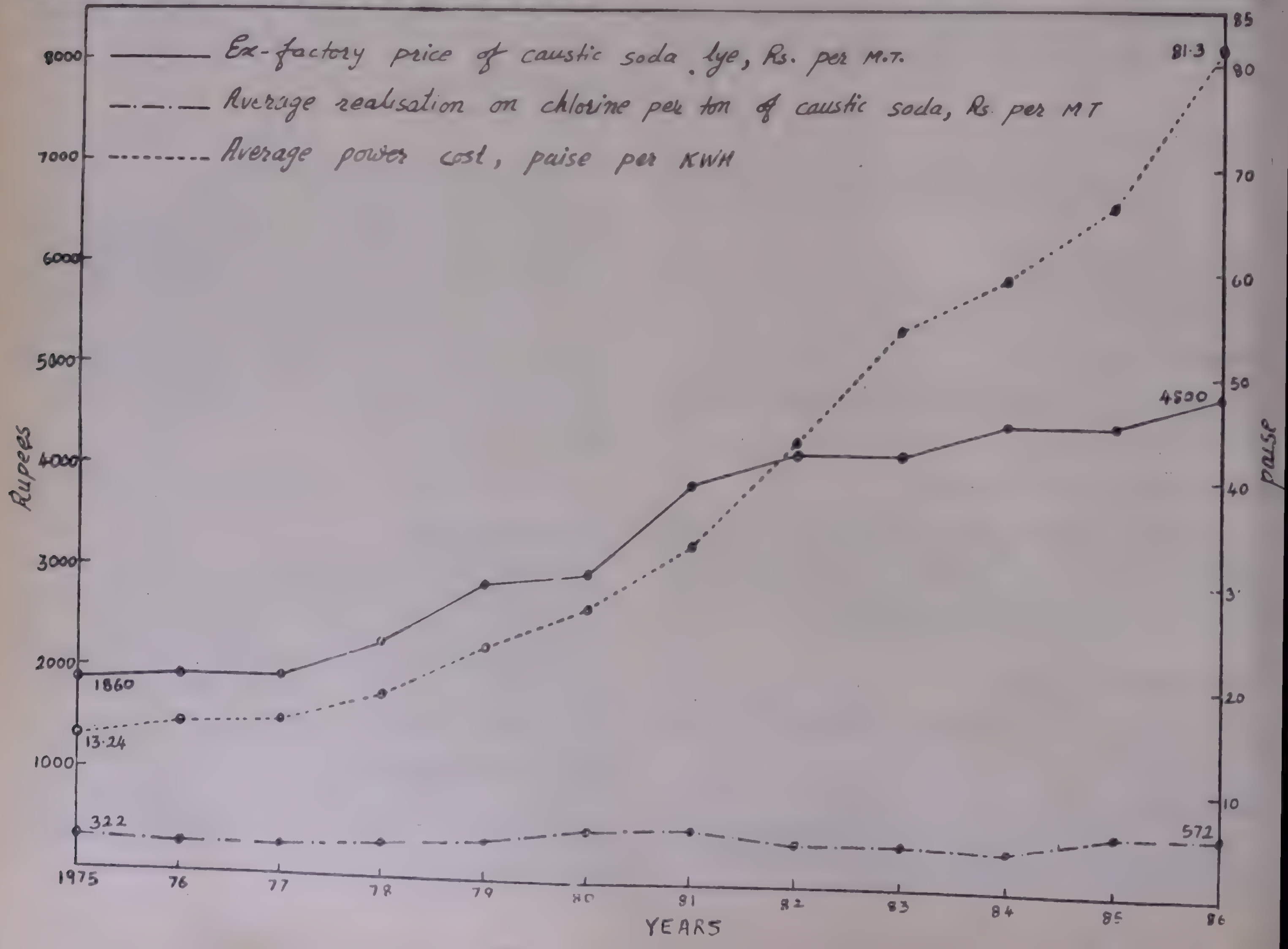

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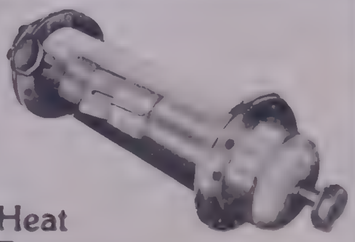

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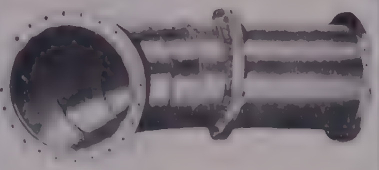

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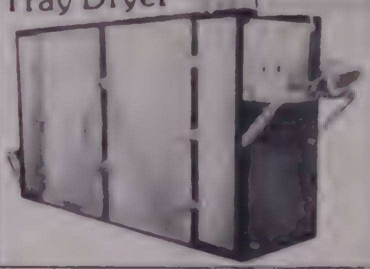

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Chemical News from Abroad

HUNTSMAN AND MITSUBISHI LINK IN STYRENE PROJECT

Huntsman Chemical Corporation of the US and Japanese trading house Mitsubishi Corp are to form a joint venture company to build a 400,000 ton/year styrene monomer plant at Baton Rouge, Louisiana. The facility will be built on the site of Hoechst Celanese's mothballed 270,000 ton/year styrene plant for which Huntsman has recently acquired a one-year purchase option — reputedly for $ 1m.

According to Huntsman, "The project will utilize some of the existing facilities and represent the latest state-of-the-art technology at a much greater efficiency than the same scale for a grass-roots project." No date has been set for start-up, but Huntsman says the engineering contractors reckon full production will commence 15 months after building begins. Observers suggest the project could cost up to $150m.

Huntsman, which will be responsible for the operation and on-site management of the planned facility, is to own 60 per cent of the joint venture company being set up with Mitsubishi.

Chairman Jon Huntsman said Mitsubishi is "an outstanding partner" and added that the project had been planned during the past year. The Japanese group sells around 450,000 ton/year of styrene worldwide.

Once the new plant is on stream, Huntsman will be the leading US styrene producer with annual production capacity of 900,000 ton year. The group's other plant, at Bayport, Texas was acquired from American Hoechst in 1985.

Ron Rasband, Huntsman's executive vice-president and ceo, said, "Approximately 180,000 ton/year will be directed to Huntsman's additional near-term internal requirements." The company has already announced a 90-100,000 expansion in its US polystyrene capacity and will supply styrene monomer to the General Electric-Huntsman facility at Selkirk, New York spring 1988.

Both the US and export markets for styrene are currently very tight with producers operating at full capacity.

ICI-NET MERGER AGREED

The merger of ICI's Irish fertilizer activities with troubled state-owned Nitrigin Eirann Teoranta (NET) has finally been announced after three years of talks. A new company comprising ICI's wholly-owned Belfast subsidiary, Richardsons and Company, and NET is to be called Irish Fertilizer Industries (IFI).

The Irish government will have a 51 per cent interest in the new venture, held by NET. The company is expected to have a turnover of I£140m ($205m) in its first year. Of debts standing at I£180m and stemming from a cost overrun on a urea plant, I£20m will pass to IFI under the deal.

Announcing the merger in Dublin recently, Irish industry minister Albert Reynolds said that gas purchased by IFI will be negotiated on an arm's length basis and be strictly market-related despite the government stake in the firm. Gas prices will be key to the profitability of the operation in the highly competitive international nitrogen business and the prospect of cheap gas was believed to have been a major factor in luring ICI into the deal.

The deal also serves to balance nitrogen fertilizer production either side of the Irish border. ICI was importing some 100,000 ton/year of ammonia for its Belfast fertilizer activities from England. This can now be supplied from the IFI surplus in the Republic. Furthermore, compound fertilizers from Richardsons' Belfast plant can be supplied to users in the south.

ERT IN AUSTRALIAN VENTURE

Spain's Explosivos Rio Tinto has agreed to take a 60 per cent stake in an Australian-based joint venture which will make explosives for local and export markets. The company, ERT Explosives Australia will be based and will be jointly owned by ETS at Gladstone, South Australia, Services. The initial investment will be Aus$2m ($1.5m).

The joint venture has also concluded a separate agreement with Rex International and China North Industries Corp. for supplies of raw materials, including ammonium nitrate.

For ERT, the venture provides a base for expansion into both the Aus$600m Australian explosives market and the growing Southeast Asian/Pacific mining markets. The new company is targeting a 10 per cent share of the Australian market within five years. Assistance for ERT Explosives Australia will be provided by the South Australia development fund.

The Gladstone plant is likely to have a total investment of Aus$20m by 1992 and will employ up to 150 people.

ENI INKS DEAL WITH FEDERCONSORZI

Enichem and Federconsorzi have finalized a deal to integrate and streamline their fertilizers and agrochemicals businesses.

The agreement will give Enichem a 40 per cent stake in Federconsorzi's Siapa, a leading Italian producer of plant care products, as well as major holdings in Federconsorzi's three fertilizer businesses.

In return, Federconsorzi is to take a 10 per cent stake in Enichem Agricoltura, the state-owned chemical group's agrochemicals unit.

In a further move, the two Italian groups are also planning to set up three new 50-50 joint ventures. One will co-ordinate fertilizers and agrochemicals output, while another will strengthen the companies' sales networks. The third venture covers research and technical innovation and will concentrate on biotechnology .

Meanwhile, talks between Enichem and Montedison concerning further rationalization of the Italian chemicals industry may start producing results in a month's time according to Enichem chairman Lorenzo Necci. Eni claims the lengthy negotiations have been holding up it's international-action plans .

PRODUCERS PREPARE FOR RISE IN CFC 22 DEMAND

Chlorofluorocarbon producers appear to be preparing for an increase in demand for CFC 22 as a substitute for the CFCs which will be restricted by the recent agreement signed under the auspices of the United Nations in Montreal.

CFC 22 is already produced by the big CFC manufacturers, but the compound does not have the same qualities as the major commercial CFCs which will be restricted by the UN agreement. A further disadvantage is that CFC 22 at around £1,500/ton is more than double the price of two of the most widely-used CFC 11 and 12 which cost around £650/ton.

One UK CFC producer, Avonmouth, UK-based ISC — a subsidiary of RTZ — is already undertaking a major expansion of its existing CFC 22 production facilities in anticipation of an increase in demand. Details of the project have not been revealed but sources suggest total cost will be between £5-10m.

Du Pont, meanwhile, is also preparing for an increase in demand. It is actively involved in the search for direct substitutes for CFCs which will be frozen at 1986 production levels in 1989 and then reduced by a further 20 per cent by 1993. But in the meantime it has recognised the potential of CFC 22 as a substitute for refrigeration, air-conditioning, propellants and blowing agents.

ICI, by far the largest European-based CFC producer, already produces CFC 22 and reckons it will be able to meet increased demand from existing capacity which is under-utilized.

According to CFC consumers, substitutes including CFC 22 LPGs such as butane and propane are likely to be used in increasing quantities in future. CFC demand in Europe is currently reckoned to be rising by 1-2 per cent a year although demand in the less developed countries is higher.

The advantage of CFC 22 compared with CFCs 11 and 12 is, that its ozone depletion potential is considerably less. While CFCs 11 and 12 have ozone depletion potentials of 1 and 0.9 respectively, CFC 22 is rated 0.05.

Despite its environmental advantage, CFC 22 suffers from some serious disadvantages. In aerosols, for example, it is less dense than CFC 12 and reduces spreading power. And while it is considerably better at spreading aerosol contents than LPGs such as butane — favoured as a CFC substitute by US consumers — CFC 22 costs up to £1,250/ton more than its competitor.

Other substitutes being considered include CFCs 142b and 152a, both of which are currently in production.

ENI-ARCO DEALS

Lorenzo Necci, president of Italy's Enichem and Harold Sorgenti, president of Arco Chemicals of the US, have inked a three-pronged agreement which includes plans for constructing two joint venture specialities plants in Italy and the US.

A new plant for the production of styrenic thermoplastic elastomers, based on Enichem Elastomer technology will be built in the US. Engineering is due to start immediately on the 55,000 ton/year plant, which is due on stream in early 1990.

Under another agreement, Arco will supply technology for the construction of a plant to produce its **Dylark** engineering resins in Italy. The unit will have a capacity of 11,000 ton/year.

A third aspect of the deal gives entry to the US market for a broad line of engineering resins made by Enichem Tecnoresine. These include polycarbonate, ABS and polyamide, which will be marketed by Arco. Development programmes and technical exchanges concerning resin blending and alloying will occur both in Europe and the US.

According to the partners, themoplastic elastomers are a fast growing speciality product combining the elastic properties of rubber with the easy processibility of thermoplastics for use n adhesive, plastic and bitumin nodification, shoes and general ubber goods. The US venture will benefit from Enichem's international marketing experience and R&D know-how as well as Arco's technical and raw material position in styrene.

Dylark resins are widely used y the automotive industry for nstrument panel headliners, and other interior trims. The European joint venture will sell directly to the automotive industry and use the Enichem Tecnoresine sales force to pursue non-automotive opportunities.

Enichem is one of Europe's largest chemical concerns, with activities in petrochemicals, plastics, engineering resins, detergent intermediates, agricultural chemicals, fibres, elastomers, fine chemicals and health care products.

Arco Chemical Company is a major worldwide producer of propylene oxide, styrene monomer, oxygenated fuels and a manufacturer of engineering resins and speciality foams for packaging, automotive instrument panels, headliners, trim parts and bumpers.

UNIROYAL BOOSTS SEEDS BUSINESS

Uniroyal Chemical Co. has expanded its seed treatment chemicals operations with the acquisition of three units from Australia's Crompton Hannaford group. Terms are not disclosed.

The acquisition, which was completed on October 1, includes Hannaford Seedmaster Services, Hannaford Macquaire Valley and some assets of Alf Hannaford & Co. With sales of around $10m a year, the Hannaford businesses provide seed treatment chemicals and sizing and grading services to Australian agriculture.

According to Uniroyal Chemical, now owned by Avery Inc., the Hannaford units will fit with its own Gustafson seeds business which is based in Texas. Gustafson makes chemicals to treat seeds prior to planting. Products are mainly for cereal crops and provide resistance to common diseases like bunt and mildew.

Uniroyal Chemical's crop protection division's sales are around $200m, with total chemical sales for the company at around $600m.

MORE COMPRESSION TO BOOST GAS FIELD'S RECOVERABLE RESERVES

One of the world's largest off shore compression facilities could result from plans to boost recoverable reserves from an old-established North Sea gas field.

Two development schemes in the area costing an estimated £88.5 million were announced recently by Amoco (UK) exploration company.

Amoco proposes to expand the compression facilities on the East Leman field by installing a new platform to house two Rolls-Royce TB211 power units, each rated at 32,000 h.p. (nearly 24,000 kilowatts). This would be added to the existing 80,000 h.p. unit on Leman.

The firm also plans to install a new satellite platform, to lay a new pipeline and to drill six development wells on the Indefatigable gas field, also in the North Sea, in order to increase its recoverable reserves.

The Leman field has been in production since 1968 and Indefatigable since 1971. The Shell Oil Company is an operator in another part of both fields.

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Chemical Markets Abroad

SHELL STARTS DEBOTTLENECKED PP PLANT AT PERNIS

Shell Nederland Chemie has started production at its modernized polypropylene plant at Pernis in the Netherlands. Capacity at the debottlenecked unit has been increased from 70,0000 to 90,000 ton/year. The company has also announced that preparations are under way for a further expansion of capacity to 135,000 ton/year and increased storage. This part of the project is expected to be on stream at the beginning of 1989. Shell has placed the cost of the new investment at Dfl. 84m ($41m).

The newly commissioned plant will employ Shell Lipp/shac technology which is a liquid phase propylene polymerisation using the company's super high activity catalyst. Shell believes that this process, used with modern process control equipment, will ensure a high degree of production flexibility and quality.

PP market growth has been anticipated at 5 per cent/year by Shell although it admits that in the current climate growth is well above this level and even into double digits. At the recent announcement of the Statoil/Himont joint PP project in Antwerp, Alexander Giacco, chairman and ceo of Himont estimated world-wide growth to be at 10 per cent/year.

Shell's figure takes into account the cyclical nature of the market and future demand for downstream products such as packaging, textiles and injection moulding used for the car industry. Shell says that even taking into account the increase in European supply, with for example, the Statoil/Himont plant, the market displays exciting growth prospects. Over the last few years 30 per cent of its PP product range has been replaced by new grades, reflecting the market's needs for more refined products. "Even the big producers need tailor-made product for their plants," said Shell.

Current PP supply is tight according to European producers, although there are signs that the market is easing. One said that if he wanted 1,000 tons of homopolymer he would be lucky to get 200 tons. Another producer said that his company did not think profit margins on PP had reached re-investment levels yet. Raffia grade is holding at DM-1.75-1.80 but could lift, and injection is reported at a little higher, even though this level is lower than summer prices.

EEC LAUNCHES UREA INQUIRY

The EEC Commission has launched an antidumping investigation into imports of urea from six countries including the US. The other countries involved are Austria, Hungary, Malaysia, Rumania and Venezuela.

The inquiry was initiated following a complaint from the Common committee of the nitrogen and phosphate fertilizer industry (CMC-Engrais) which represents the EEC's major fertilizer producers such as ICI, Montedison and BASF. CMC-Engrais claims that the EEC's urea imports from the six countries quadrupled from 120,000 ton/year during 1983-84 to an estimated 414,000 ton/year during 1986-87. Their market share rose from 3.6 per cent to 12 per cent during this period. The committee alleges that the price at which these imports were sold into the community significantly undercut that of European producers, in particularly in West Germany,

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France, Ireland, Italy, Spain and the UK.

In May this year the commission imposed antidumping duties on imports of urea from Czechoslovakia, East Germany, Kuwait, Libya, Saudi Arabia, the USSR, Trinidad and Tobago and Yugoslovia following a CMC-Engrais complaint. This duty was to have ended at the beginning of September but has been extended for a further two months. More recently, customs duties on urea imports from Mexico and the United Arab Emirates have been re-established.

The commission is also investigating a tax levied on imports of nitrogenous fertilizers from the EEC into Portugal. A tax of ESc2.7/kg ($0.19/kg), which is not applied if product is manufactured and sold in the country, is being levied on fertilizers. The dispute centres around the classification of fertilizers as "dangerous substances" and not as "explosives.". In Portugal, traders in the latter have to pay a monthly tax on transactions, whereas fertilizer traders do not. However, customs authorities will not release imported quantities of fertilizers until a tax has been paid. This, the commission claims, constitutes a customs duty.

Elsewhere, in Australia, a budget statement from Federal Treasurer Paul Keating indicates that the government will provide Aus$68.5m ($49.3m) to maintain fertilizer consumption subsidies designated to offset the effects of anti-dumping duties. Expenditure in 1986-87 totalled Aus$92.1m. According to the statement the reduced costs of the subsidies reflects lower dumping duties.

UOP COMMISSIONS TEXAS ISOMER PLANT

Allied Signal subsidiary, UOP, has commissioned a Penex isomerization unit at its Texas City refinery. UOP claims it is the world's largest light naphtha isomerization unit designed to process a blend of light straight run naphtha, raffinate and light reformate.

It catalytically increases the octane rating of a light naphtha feed blend where lower octane isomers are recycled after being recovered in a de-isohexanizer. The Texas City unit can process 1.3m ton/year of combined feed and isomerate product which is used as a blending component for gasoline production.

UOP designs and licenses more than 50 processes for the petroleum refining, and gas processing industries as well as catalysts, chemicals and additives.

CANADIAN COMPLAINTS REDUCE VAM DUTY

Europe has reduced its level of antidumping duty applied to imports of Canadian vinyl acetate monomer (VAM) following complaints from Celanese Canada.

The EEC commission imposed a duty in 1984 equal to the price difference between imported VAM and the floor price of Ecu-657/ton ($735/ton) Celanese, however, argued that production costs have fallen substantially since the original duty was fixed. The floor price for duty was based on the market price needed by EEC producers to cover costs plus profits, but Celanese argued that is should correspond to the current cost situation.

As a result, the floor price for duty has been reduced to Ecu-525/ton. Duty introduced last month on VAM from the US remains unchanged.

In India VAM Organic Chemicals has been given the go-ahead for a Rs. 105m ($11.48m) project to manufacture ethylene vinyl acetate copolymer. Ethylene will be brought from UP Glycols to the 6,000 ton/year plant which will be centred in the Kashipur district.

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News from the American market

AN AUSTRALIAN PEROXIDE EXPANSION IS COMPLETED

Interox Chemicals Pty. Ltd., Australia's only producer of hydrogen peroxide, completed an expansion program that raised its capacity to 10,000 metric tons/year. Interox has "a substantial majority" of the Australian domestic market, says George Valiukas, the company's general manager. Imports, he says, supply less than 25% of the Australian market. The company expects that growth of the domestic Australian market will require further expansions within the next five years.

PENNWALT HIKES SPOT CHLOR-ALKALI PRICES

Pennwalt has raised its spot prices for liquid caustic soda by $25/ton and chlorine by $10/ton, and will raise contract prices when terms permit. The company says that neither price is to exceed current lists for the products. Trade sources say that world prices for the two products continue to exceed prices in the U.S., and any further weakness in the dollar will accentuate the differences.

BASF CORP. POSTS NEW ANTIFREEZE PRICES

BASF Corp.'s Chemicals Div. has posted increases in list prices for antifreezes, effective Oct. 1. The new tabs for private brand Aluguard formula antifreeze will be $2.93/gal in cases of six, $2.68/gal in 55-gal drums and $2.25/gal in bulk tank trucks. Private brand All-Purpose formula will be $2.85/gal in cases of six, $2.60/gal in 55-gal drums and $2.19/gal in bulk tank trucks. Award brand All-Purpose formula will be $2.83/gal in cases of six, $2.59/gal in 55-gal drums and $2.19/gal in bulk tank trucks. Monocol Plus, sold on the West Coast, and Sno Flo Plus Aluguard formula material will be $2.91/gal in cases of six, $2.66/gal in drums and $2.25/gal in bulk tank trucks. The new list prices, as quoted, exclude promotional programs and are f.o.b. distribution point in truckload quantities, with an 8 cent/gal surcharge for shipments from West Coast distribution points.

DOW RAISES PRICES OF SEVERAL PRODUCTS

Dow Chemical has raised off-list prices by 3 cent/lb for several products, including ethylene oxide, ethylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol and ethanolamines. In Zones 1 and 1A, the distributor price schedule for ethanolamines is less 4 cent/lb temporary competitive allowance. Monoethanolamine will be 40 cent/lb; diethanolamine, 41 cent/lb; triethanolamine, 42 cent/lb; Trolamine, 44 cent/lb. Dow also raised list tabs for Ambitrol brand coolants, effective Oct. 1. Prices will rise 25 cent/gal, ranging from $3.75/gal to $5/gal. Ambitrol inhibitor will rise by $25/drum and pail, to $725/drum and $125/pail. Truckloads of drummed material will carry an upcharge of 70 cent/gal.

LITHIUM CORPORATION RAISES PRICES

FMC's Lithium Corp. subsidiary has raisen prices for lithium metal and a variety of lithium compounds. These increases, effective Oct. 1, are generally about 5%, but some exceed 9%, while the tab for lithium metal foil is up 2%. Included in the increases: technical lithium metal, up $1.25, to $25.45/lb; alloy grade metal, up $1.35, to $27.95/lb; battery quality metal, up $1.65, to $36.10/lb; technical lithium carbonate, up 7 cent, to $1.57/lb; lithium hydroxide monohydrate, up 10 cent, to $2.03/lb; anhydrous lithium sulfate, up 30 cent, to $3.51/lb; lithium nitrate, up 17 cent, to $3.57/lb; lithium acetate, up 10 cent/lb, to $2/lb; and n-butyllithium in hexane, up 75 cent/lb, to $15.85/lb.

COPPER PRICES MOVE UP

Copper prices have turned up after a period of fluctuation in the 80-85 cent/lb range. Several producers raised their prices above 85 cent/lb and some cathode tabs reached as high as 87 cent/lb. Producer prices were 64-65 cent/lb a year ago. The price of copper scrap has been keeping pace with tabs for primary metal. Last week, No. 2 copper wire was 66 cent/lb compared with 44.75 cent/lb a year earlier. The uptrun comes at the end of the normally slow summer period and may signal a new move toward higher prices for the metal. U.S. consumption of refined copper, says the Bureau of Mines, was up 11% in the first half of 1987, and refined copper production rose about 6%.

MATERIALS PROCESSING R & D GETS BOOST IN OHIO

The Air Force Wright Aeronautical Laboratories (AFWAL), part of Wright-Patterson Air Force Base (Dayton), has agreed to collaborate in material processing research with the nine-month-old Edison Materials Technology Center (EMTC), one of seven research centers partly funded by Ohio's Thomas Edison program. Two planned EMTC research projects that AFWAL may get in on: superconductivity and highly permeable magnetic materials.

In the European market

Naphtha prices have fallen $4/ton in the past week to $160-165/ton cif NWE under pressure from slack demand for October.

Little change in the **ethylene** market leaves spot prices at $475-480/ton cif NWE for November arrival, with Mediterranean prices at $460-470/ton. ROW's G6 cracker is still at 70 per cent of capacity and DSM's scheduled shutdown is causing blockages in the ARG pipeline. Most supply is coming from Libya as Qatar and Brazil are reported to be sold out. US demand is good and prices have settled at 17-17.5 cents/pound.

European spot prices for **propylene** are climbing and although business remains at DM570-580/ton cif, some deals have been done at DM610/ton. US demand is easing as Brazilian and Venezuelan product enters the US Gulf. Q4 prices have been mooted at DM530-550/ton but are unlikely to be settled before the end of October. Shell is still holding firm for monthly contracts having offered a ceiling of DM700/ton, with a TVA of DM50/ton for October, negotiable again in November. There are no takers yet.

Butadiene prices have firmed up by another $10/ton in the past week to $590-600/ton. The market remains very tight. Exxon Chemical, Shell and Texaco in the US have closed plants for maintenance, and stock levels have fallen to half the average figure. Some fourth quarter contract prices have been agreed at FF3 600/ton ($593/ton).

Benzene prices have slipped to $260-270/ton in a relatively long market and higher toluene prices have failed to have impact. There are very few buyers for October, and traders are speculating generally on November interest. US prices have weakened and 88 cents was rumoured

Toluene prices are steady at $220-225/ton underpinned by some short-covering for supplies to major Dutch buyer, DSM. Supply has been tightened by production problems at Exxon.

Following the recent recovery styrene prices have settled at $1,230-1,240/ton fob Rotterdam for T2 material, but T1 has moved up to $1,160-1,170/ton cif NWE. Tight supply in the US has been exacerbated by planned shut downs at Arco and Sterling, and unplanned closures at Amoco and Chevron. Fourth quarter contract prices have been settled at DM2,200/ton.

Paraxylene prices have been steady at $325-330/ton but are easing back to $320/ton. Producers say they expect to see a slight firming of prices later. Business has started picking up and there have been several small lots sold between traders.

Orthoxylenes prices have slipped $15/ton in the past week to $255-265/ton in a very quiet market. Producers say prices have reached a level relative to xylenes feedstock where production is barely viable. Total of France is expected to restrict production to the minimum for contract commitments.

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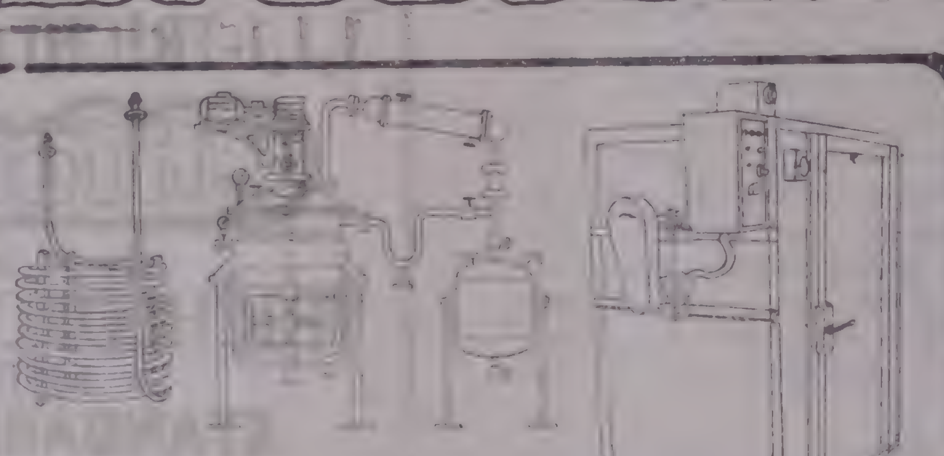

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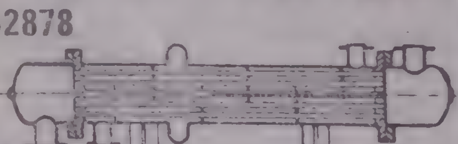

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Biotechnology

EUROPE AWAITS DECISION ON AID FOR TECHNOLOGY

Europe is still awaiting a decision from the EEC commission as to whether it will support a programme to promote the production of bioethanol from cereals as a means of reducing the burgeoning EEC grain surplus.

Opinion amongst member countries' ministers remains divided. France has already adopted measures in favour of the use of cereals and sugar beet for fuel production. In July, French prime minister Jacques Chirac cut ethanol tax from FF2.20/litre, bringing it in line with diesel oil taxation.

Italy and Germany have repeated their request that the commission should take measures to encourage the use of agricultural products in fuel production. They have agreed with the French initiative, as did the Netherlands. The UK, however, is opposed to the move, and declared that "there is no simple response to serious problems." The UK position reflects the oil producers' lobby that they do not want to launch into the use of bioethanol as a gasoline additive until it becomes competitive.

European commission vice-president Andriessen has confirmed that the commission will take a stance soon, but a debate scheduled for last week has now been postponed until the end of the month.

The bioethanol debate took on a new twist earlier this month when Italian commissioner Carlo Ripadi Meana came out against the use of farm surpluses for bioethanol production, contrary to Italy's previous position. In an article published in Italy's Corriere della Sera he spoke of "a carefully orchestrated campaign which grows more strident and insistent every day and aims to force the commission's hand into undoing the community's purse strings." He claimed that turning wheat into bioethanol would "create new surpluses on top of existing ones" and could cost twice as much as cereal export subsidies.

However, these views have been vehemently opposed by Raul Gardini, president of Italy's Feruzzi which now has a 35 per cent control in European starch production. He claimed that the Commissioner "had not read what has previously been published on the subject." According to Gardini, the EEC could save up to 55 per cent of expenditures in grain export refunds by using production surpluses, even those that are subsidised, for bioethanol.

This view is supported by Jean Grenier, ex-president of the organic chemicals and biochemicals manufacturers association. "It is difficult for the commission to do nothing," he said. "But the question remains as to how far it will go in support of the European agricultural lobby." He affirms the belief that encouraging ethanol production by granting refund for wheat used in fuel production would be cheaper than export refunds.

Few observers are prepared to bet on the commission's decision to grant aid to bioethanol but clearly belief is growing that the developing industrial and energy markets could provide the answer to Europe's mushrooming grain surplus. This is expected to top 27m ton by the end of the decade.

PHARMACIA ACQUIRES BIOTECH R&D FIRM

Sweden's Pharmacia is strengthening its interest in cancer research with the acquisition of Stena Diagnostics, a biotechnology R&D concern owned by the Swedish shipping group Stena Line. Terms were not disclosed.

Stena was established in 1983 to develop diagnostic reagents based on monoclonal antibodies for the early detection of cancer. It has already developed a number of reagents used in the **Delfia** test system marketed by Pharmacia Diagnostics. Stena has annual sales of Skr10m ($1.5m).

Pharmacia is particularly interested in Stena's research into the production of antibodies for use in the treatment of cancer tumours. The companies have jointly received a development grant of Skr21.4m from the Swedish industrial development fund. R&D operations will be carried out in close co-operation with the university of Gothenburg.

WEST GERMAN DRUG PRODUCTION IMPROVES

Pharmaceutical production in West Germany improved slightly on the year before, increasing 2.7 per cent to DM10.5bn ($5.75 bn) for the first half of 1987, according to figures released by the pharmaceutical industry association Bundesverband der pharmazeutischen. This compares sharply with a 2.4 per cent decline reported for the first half of 1986.

The negative trend in pharmaceuticals exports also turned around for the first six months of this year, the association said. Export sales moved ahead 1.3 per cent to DM5.9bn against a 1.3 per cent decline in the year earlier period

Imports of pharmaceuticals into West Germany declined by 3.1 per cent to DM1.4bn for the first half of this year although this was not quite as marked as the 5 per cent decline reported for the first half of 1986.

GERMANS PINPOINT NEW CARCINOGENS

West Germany has revised its so-called MAK list which sets maximum concentration of hazardous substances permissible in the workplace. The new list stipulates reduced emissions and also pinpoints a number of newly-recognized carcinogens.

Among new provisions are a 50 per cent reduction in permissible plant emissions of formaldehyde and a reduction in methyl aniline and styrene emissions by 25 and 20 per cent respectively.

The MAK team of the German research society Deutsche Forschunge-gemeinschaft which has responsibility for setting the limits has pinpointed diesel emissions as carcinogens for the first time. It also lists five aromatic amines and a number of chlorine compounds as recognized carcinogens. Three substances were added to the list of suspected carcinogens.

For the 1988 list, the research society will examine the potential carcinogenicity of a lengthy list of additional substances including biomethane, ethylene oxide, nitrobenzene, styrene, toluene, vinyl acetate and xylene.

BOOTS IN IBUPROFEN EXPANSION

Boots, the UK pharmaceutical group, is to spend £3m expanding production of the anti-inflammatory drug ibuprofen at its Nottingham, UK plant.

New facilities to be installed by June next year will raise capacity by over 50 per cent to more than 3,000 ton. Boots says the expansion is in the response to rapid growth in demand for the drug which is used to treat arthritis.

Boots is currently the world's leading ibuprofen producer and Ethyl Corp of the US holds second spot. Together, the two companies control over 85 per cent of the world market. This is estimated to be worth $700m for combined sales of prescription and over-the-counter (OTC) product. Sources suggest that overall the market is currently growing at 10-15 per cent annually, although prescription sales have been hit by generic competition.

Since its discovery by Boots in the 1960s, ibuprofen has rapidly gained acceptance as a treatment for arthritis and related diseases. Since 1983, when it first acquired OTC status, ibuprofen has captured a major share of the world OTC analgesic market.

In the US, Boots OTC ibuprofen product, **Advil** has gained 10 per cent of the analgesic market. This is estimated to be worth a total of $2.7bn. In the UK, the equivalent OTC product, **Nurofen** is the market leader with over 13 per cent market share.

UK DRUGS FIRM SIGNS LICENCE WITH UCB

Allen & Hanburys, a subsidiary of the UK Glaxo group, has signed a license agreement with Belgium's UCB to market the company's new anti-allergic Cetirizine **(Zyrtec)** in the UK.

Cetirizine, which is used in the treatment of hay fever, perennial allergic rhinitis and other allergic conditions will be supplied by UCB to Allen & Hanburys. The deal also provides an option for UCB to acquire products from Glaxo's portfolio.

The agreement also represents the start of UCB's pharmaceutical activities in the UK through the development of its UCB (Pharma) subsidiary.

VITAMIN RESEARCH

Scientists at Japan's Nippon Zeon have reported the first results of a joint research programme with French genetic engineering concern, Transgene, to develop a fermentation route to the vitamin biotin (vitamin H).

The bio-B gene of B. **sphaericus**, a micro-organism known to produce biotin has been cloned and sequenced by researchers and expressed in E. **coli**. The discovery could mark the first step in the commercialization of a fermentation route biotin, replacing the costly chemical process.

The vitamin, which is involved in the metabolism of fats and carbohydrates, is now increasingly used as a supplement for human and animal nutrition and in cosmetic preparations. The world market stands at around $10m and is poised for rapid growth.

IMMUNOLOGY JV

West Germany's E. Merck has signed an agreement with Salk Institute Biotechnology / Industrial Associates (Sibia), the biotechnology marketing arm of the US-based research institute, covering joint research in immunology.

Under the terms of the deal Merck will pay DM2m ($1.1m) over three years to finance the project. The Darmstadt-based chemicals and pharmaceuticals groups said that most of its share of the R&D activities will be carried out by its Spanish subsidiary Probus.

Although declining to be specific about research goals, a spokeswoman for Merck said that cancer research but not Aids will certainly be one of the focal points.

News About New Projects

JAPANESE TEAM WINS SOVIET CHLORALKALI CONTRACT

A Japanese team comprising Mitsubishi Corp, Asahi Glass and Chiyoda, has won a contract to build a chloralkali complex in the Soviet Union.

Signed on October 5 in Tokyo, Japan by Techmashimport's president Anatoli Yushkin in the presence of Yuri Bespalov, minister of the Soviet chemical industry, the contract is said to be worth over the estimated $90m and be closer to the $100m mark. It is expected to come into force in December of this year and include compensation covering the loan as well as interest.

The largest part of the three-pronged investment covers the conversion of an existing 110,000 ton/year mercury cell chlorine plant (capacity expressed in terms of caustic soda) at Volgograd to ion exchange membrane technology and the doubling of capacity. This part represents about one-half of the total investment cost.

The second part is the setting up of facilities at Dzerzhinsk to produce electrolyzers and membrane cells to be used in any future conversion or expansion projects and the third, which was awarded to Asahi Glass earlier this year, is for a project at Leningrad to produce membranes for any future plants.

Negotiations are currently under way with the Exim Bank of Japan to raise the US dollar denominated loan which is expected to bear 7.5 per cent interest and last over 8.5 years.

The compensation arrangements, to be handled by Mitsubishi Corp, will cover the loan as well as interest and extend over a period of 8-10 years, starting in January 1988.

Mitsubishi reportedly has the option of paying 2 per cent commission to Soyuzchimexport, should it decide to opt out of the compensation obligations. This, however, has not been confirmed and the company could end up lifting product from the USSR. There are seven items that Mitsubishi could handle, including styrene monomer (much needed in the West at present), methanol and, when the plant is built, chloralkalis. Acrylonitrile could also be included.

Construction of the facilities will be on a tight schedule and completion is expected in 1990. Asahi Glass will supply its technology for all three units and Mitsubishi Corp will act as main contractor and take care of financial and compensation arrangements. Chiyoda will act as engineering contractor on the Volgograd facility.

The competition included De Nora, reportedly the second cheapest offer, Toyo Engineering/Asahi Chemical, Simon Carves/ICI, Oxytech, and Uhde/Du Pont.

The Soviet Union was reportedly keen to acquire Du Pont's technology but the US firm was reluctant to give the complete know-how.

Japanese contractors have recently won orders from the USSR totalling some $900m. These include terephthalic acid, polyester fibres, acrylic acid and esters and ammonia revamp projects.

ISDRALIT IN BRAZILIAN PVC PLAN

Isdralit SA, a private Brazilian producer of plaster and cement, is set to enter the chemicals bu-

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(KNS-ADI)

siness with the production of vinyl chloride monomer and PVC.

The plant would be set up at Triunfo in Rio Grande do Sul, near Copesul's petrochemical complex. The latter has recently been given the go-ahead to expand ethylene capacity from 420,000 ton/year to 561,000 ton/year. This plant, supplied by Technip and KTI, has operated at 450,000 ton/year, well above nameplate capacity.

Miguel Palma Lampert of Copesul said that his company will supply ethylene to Isdralit at a rate of 47,000 ton/year and provide facilities to ship ethylene dichloride from Salgema's Maceio-based complex. The latter will supply Isdralit at a rate of 148,000 ton/year of EDC.

Isdralit is negotiating with B F Goodrich of the US the possibility of acquiring VCM/PVC technology. The project may be undertaken in a joint venture with European partners. Construction is due to begin early in 1988 for completion in 1989-90.

Finance for the scheme, Isdra said, will come from internal resources (40 per cent), Petroquisa (20 per cent) and the European group (30-40 per cent). IFC could also provide some of the finance.

On completion Brazil's total PVC capacity will be in the region of 700,000 ton/year. The product is currently produced by three companies. CPC at Camacari makes 250,000 ton/year and is building a new 200,000 ton/year unit, Brasivil Resinas Vinilicas has a 50,000 ton/year unit.

LURGI TO BUILD ACID COMPLEX IN UAE

West Germany's Lurgi has won a contract to build a $71m grassroots chemical complex in the United Arab Emirates. The contract, awarded by Emirates Narmada Industries, a joint venture between India's Gujarat Narmada Valley Fertilizers Co and Abu Dhabi's Mozak International Inc, calls for the construction of plants to produce 1,400 ton/day of sulphuric acid and 500 ton/day of phosphoric acid.

The complex will be located in the Arab Gulf town of Jebel Ali, 40km from the town of Dubai, UAE. The sulphuric acid will be used on site to make phosphoric acid which will be exported, mainly to India. Shipments will have to pass through the Strait of Hormuz but the product is not regarded as politically sensitive.

Supplies of phosphate rock are currently under negotiation and could come from suppliers such as Jordan, Togo or Tunisia.

Lurgi will provide its proprietary sulphuric acid technology and Norsk Hydro its hemihydrate phosphoric acid process. The scope of work awarded to Lurgi includes process design, detailed engineering, procurement and construction supervision services up to and including commissioning, as well as training of personnel.

GNFC, a major shareholder in the venture, is a leading Indian company producing fertilizers, methanol and other chemical specialities.

The land in free-zone Jebel Ali belongs to the government of Dubai, which is currently negotiating other chemical investments in the area.

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BEAM HOUSE AND TANYARD PROCESSING

A SYSTEMATIC ACCOUNT OF THE PRECONDITIONS FOR CONSISTENT QUALITY

Dr. J.C. CROWTHER

(Continued from the previous supplement on '*Leather Processing*' (20th October 1987)

Washing

When environmental protection and water conservation were not pressing considerations, it was the practice to give a thorough wash at each stage of wet processing to remove unbound tannins, etc. -- and to remove unwanted neutral salts.

These salts arise not only along with salted hides, and in pickling, but also with the chrome salt and as a by-product of neutralization. The pressures on the leather industry to reduce water consumption and concentrate effluent has reduced the washing of leather. In addition "compact" processes have been introduced to speed up and simplify chemical processing. As a result, high levels of neutral salt build-up in the leather.

This build-up affects subsequent chemical equilibria, especially the stability of fat emulsions and the aggregation and ionization of dyestuffs. It also affects consumer satisfaction with leather if the accidentally rained-upon wet article dries out with a white crust of salt crystals. The crystals on the surface may be brushed away, but those within the grain layer tear and distort the fine structure of the grain enamel.

Control Points for consistent quality:

- Temperature
- Time
- Closed door or lattice door (float fixed or running water)
- Complete draining of drum, before and after washing
- Two shorter float washes with closed door are more efficient than one long-float wash.

Consistent quality in wet-blue selection

The application of fluorescent pigments in leather grading and selection

Accurate preselection in the wet-blue allows the tanner to operate the most efficient and economic grading system according to the quality standards needed for the finished leather.

Thus economic retannages and aniline finishes can be used, when appropriate, to maximize the value of the leather. The tanner can avoid processing the hides with good grain selection into heavy pigmented, printed or even corrected grain and thereby avoid a loss of potential value.

Dispersed fluorescent pigments with anionic charge are added into the exhaust chrome tan liquor or into a fresh bath if wet-blue is being sorted. When viewed under UV light (315-380 nm wave length) the grain damage, not normally visible, is highlighted making grading and selection more accurate.

It should be noted that water-soluble fluorescing agents, optical brighteners, etc., produce a uniform uptake on the leather and do not show up the faults and scars. Suitable fluorescent pigments for this application have:

-- yellow/green fluorescence

-- blue fluorescence.

It is possible that, as green is less tiring on the eyes than blue, the yellow/green brands are more suitable for this application.

Application

Wet-blue sorting:

The fluorescent pigments are added into the exhaust tanning liquor (after basification) and run for 15 to 20 minutes. Application level: 0.03-0.10% calculated on limed weight. Subsequent processes do not change.

Crust sorting:

The fluorescent pigments are added immediately after neutralization and run for 15 to 20 minutes. Application level: 0.10-0.50% calculated on shaved weight. Subsequent processes do not change.

Note:

1. At proposed levels, the fluorescence fades away during retannage. According to the intensity of fluorescence desired, especially when sorting in the crust before finishing, the application level may be increased.
2. Illumination by UV lamps having 300-400 nm.
3. Grading and selection is normally carried out in places well illuminated by daylight, with additional

artificial strip lighting over the table. This method requires a dark sorting room, with the only illumination coming from the UV lamps.

Retanning

Although not properly a tanyard operation, retanning is considered here as a process prior to dyeing. In most cases it does precede dyeing and has a significant impact upon the property of the leather as a substrate to be dyed.

Ideally all tannery processes are designed taking the leather consumer's requirements as the objective, commencing from the soak. In practice it is not efficient to change processes before tanning to suit the needs of each client. A soft leather might ideally need more bating, garment suede could have longer liming and more Cr_2O_3 fixed in tanning, firmer shoe leathers should be limed more quickly.

In practice, therefore, the tannery has to decide on its average needs and carry out the processes accordingly up to the wet-blue stage. The one essential which must be observed: consistency and uniformity of processing.

At the stage of retanning, it is possible to start directing the leather quality towards the quality requirements of the end-user.

Chrome retannage

This process is available to change the wet-blue, if the following properties are unsatisfactory:

-- irregular chrome tannage

-- too low shrinkage temperature

-- too low Cr_2O_3 fixed in the leather.

Depending on the extent of irregularity, it may be necessary to carry out an acid wash and even apply complexing agents to help strip out chrome stains.

The process itself is carried out in the same manner and with the same controls as noted for chrome tannage. The problem lies in the uncertainty of the efficiency of chrome fixation in the leather. Including basification, the process lasts up to two hours. Most tanneries do not permit time for fixation during horsing up. As a result, chrome can be detected in the wash bath -- even after dyeing. Improved fixation is obtained with special high basicity chrome salts, but even here complete fixation is in doubt.

As a result, the trend is to ensure that the original tannage is performed under optimum conditions and control, making chrome retannage unnecessary. It seems to be generally accepted that chrome retannage is environmentally undesirable.

Other mineral retannages

A common attribute of mineral salt retannages is an intensification of dyeings; the extent of intensification depends on how strongly it is "masked" or complexed with anions, but there is a noticeable improvement in the brilliance and color yield.

This would suggest that a combination of mineral retannage with other anionic retannages would overcome the negative impact of the latter on dyeing properties. Unfortunately the negative properties prevail.

Zirconium retannage

Applied as a strongly masked basic sulfate, it has a tendency to form large aggregates between the fibers. As a reslt of such inorganic deposits between the fibres, the leather gains fullness, but logically it is a harder leather. If soft leather is required, the hardening must be compensated by the fatliquoring; the most effective application being simultaneous with the zirconium retannage.

The acidity of this retannage (pH 1.8 to 2.9 depending on the basicity of the zirconium) and the high level of electrolytes make careful choice of a suitable fatliquor imperative. Such retannages have been very successfully applied on wool sheep garment leather. In addition, the filling of the fibers and good dyeing properties produce a fine, tight fibred suede nap with fast and brilliant dyeings. Unfortunately the affinity for the dye is so high that cationic dye auxiliaries are recommended to counter a tendency to unlevelness. These auxiliaries have low cationic charge which complexes with the anionic dye limiting its affinity and slowing its uptake by the leather.

Aluminium retannage

Applied as sulfates or chlorides, they do not perform under such extreme pH conditions, nor is the fixation and filling action so marked. They also result in softer leather with more stretch.

Titanium retannage

A possible future application exists as titanium is a most abundant element in the earth's crust. Work has been carried out on titanium sulfate at the Central Leather Research Institute, Madras, on ammonium titanyl sulfate in the USSR and on titanium chloride at the Tanners Council Research Laboratory at the University of Cincinnati. In all cases the studies involved the reaction as a crosslinking agent and showed different approaches in using the material in tanning. It could be foreseen that, as a retannage, titanium would have properties intermediate between zirconium and aluminium and posses the same advantages of whiteness and good dyeing properties.

A benefit in the introduction of such a system would be the ease of removal from effluent and the low or non-toxicity of the salts.

Control points for consistent quality:

- Consistency of preceding processes
- Age of the wet-blue
- Temperature and time
- pH/time profile
- Drum speeds
- Drum dimensions
- Use of amphoteric speciality auxiliary
- Consistent accurate basification
- % mineral oxide in leather
- % mineral oxide in exhaust float.

Vegetable-retannage and phenolic syntan retnnage

As might be deduced from the fact that phenolic syntans were developed to replace vegetable tannins, both of these retannages have similar effect on wet-blue as regards their fixation and subsequent effects on dyeing properties.

The purpose of their application is to take advantage of the deposition of large tannin aggregates between the fibers in order to maintain fiber separation and fill spaces in the loose parts – under the grain and in the flank areas.

The chrome present in a wet-blue makes the collagen very reactive towards this system and there is a risk of surface deposition. In order to avoid this and ensure uniform uptake and complete penetration, the wet-blue should be uniformly neutralized to ca. pH 5.0 and at the same time dispersing auxiliaries should be used. (An overtanned grain has reduced elasticity and the leather may burst when the shoe is lasted).

The main difference between the natural and synthetic tannins is that the synthetic tannins are colourless to beige, smaller molecules with relatively higher amounts of solubilizing groups (usually strongly dissociating sulfonic-acid side chains).

They therefore have a comparatively lower tendency to form the filling aggregates necessary for imparting fullness. In contrast the vegetable tannins are comprised of a huge family of polyphenolic molecules, some of which are more soluble at higher temperatures. Their readiness to ineract and agglomerate has been the basis of the oldest method of modifying the properties of wet-blue. They give fullness, tight grain and temper.

They also contribute their own natural brownish colour. Their poor lightfastness results in rapid darkening of leathers dyed in light colours. Dark brown shades may benefit from compensatory fading of the brown dyestuffs, and a better overall lightfastness may result. As stated before, vegetable tannins should be used together with dispersing systems to avoid the risk of cracky grain. This risk puts a limit on the amount which may be applied.

The most notable limitation on vegetable and synthetic polyphenolic tannins is upon the dyeings. Due to the effect on the iso-electric point, the leather becomes much more anionic and affinity for anionic dyes is lost. This results in poor colour yield and washed-out colours. Apart from this, there is a secondary reaction which changes the tone of the dyeing entirely -- making the colour matching of brilliant shades problematic.

Today, the drawbacks of this retanning system are minimized by reducing the amounts applied. The deficiencyis compensated by increasing amounts of newer retanning agents providing properties lacked by the polyphenolic tannins.

Unfortunately no single retan possesses all the properties needed by a tanner. Nearly none have the property needed most by the dyer; dyeability. As a result retan combinations are becoming more complex, with ever greater variations in dyeing properties from leather to leather.

Control points for consistent quality:

- Consistency of preceding processes
- Temperature and time
- pH/time profile
- Degree, penetration and uniformity of neutralization
- Use of dispersing auxiliary
- Washing to remove excess tannins from the grain.

Methylol urea derivatives

These are synthetic resin precondensates, more notable for grain fixation than for filling or effect on the handle of the leather. As previously stated, it is desirable to have a uniform neutralization of a chrome leather to encourage penetration and uniform deposition of the normal retans. There is, however, a risk that neutralization will cause loose grain.

The methylol urea derivatives not only prevent this, but fix the fine grain pattern of the wet-blue -- preventing the usual coarsening effect of a vegetable retannage. Penetration takes place above pH 4.0 and coagulation/condensation in acid medium (under pH 3.6). This indicates application to the wet-blue after slight neutralization of the grain enamel. Neutralization can be by rinsing or by the adition of 0.2-0.5% sodium formate for a short period of 5 minutes. Addition of the methylol urea derivative allows penetration through the higher pH zone and deposition under the grain. It is seen to have the effect of sealing together the grain and the corium, producing a tight grain. Subsequent neutralization, fatliquoring and processes, which normally cause loose grain, can be carried out with a large measure of safety.

It should be warned that non-ideal application may not produce the desired results; too acid grain surface might cause surface deposition; too neutral leather will cause too deep absorption and no effect on grain tightness.

These products have been observed to have no effect on the dyeability of the leather. In addition, when applied in the manner described, no hardening or change in handle occurs.

Control Points for consistent quality:

- Neutralize grain to pH 4.0 before retannage
- Check cut edge with bromophenol blue -- green/blue colour penetrates only to hair roots, i.e. through grain enamel
- Do not run too long with neutralizing agents, 5 min maximum, otherwise acidity from the corium leaches out and the grain neutralization is lost.
- Do not wash too long, otherwise the corium acidity required for the condensation is lost.

Reactive urea formaldehyde derivatives

These products are used to produce an improved fullness and uniformity over the area of the hide. By combining with polyphenolic tannins, they selectively fill the looser structured flank areas giving a better cutting value to the end-user.

Whilst these products are not new, a development has taken place in the understanding of their mechanism of reaction; the slow but steady addition of the product of RUF and tannin can be observed in a test tube -- producing an amorphous insoluble precipitate over a period of several hours. The effect takes place between pH 3.0 to pH 5.5.

The consequence upon the polyphenolic retannage is two-fold:

-- up to 50% extra fullness

-- improved colour yield and brilliance of the dyeing.

As a result the quantity of phenolic tannin can be reduced, with a consequent improvement in the elasticity of the grain and a still further improvement in dyeing properties. Due to the slow reaction, the product may be added simultaneously with the vegetable or synthetic retan. In the processing of suede, this type of retannage presents a uniformly filled fiber structure. The buffing paper cuts the fiber cleanly and short, producing a more uniform nap across the surface towards the belly area.

A further benefit of the use of RUF retannage systems is the reduction in stretch. Where soft leather is produced and higher qualities of fatliquor used, it is common to note an increase in stretchiness of the leather. This causes difficulties in the dry processing of the leather and in the dimensional stability of the article produced, whether it be for shoe, garment or upholstery.

Control Points for consstent quality:

- pH of system at application
- Uniform period (15-24) hours c horsing up before drying (t allow the system to react).

Acrylic elastomer solutions

These retanning agents hav been widely accepted in place of th earlier introduced amorphous acryli emulsion retans. Although the latte showed selective filling properties they had a tendency to harden th leather.

Elastomerics do not noticeably fi the spaces between the fibers of th leather. They confer a rounde handle by changing the temper c the leather. This roundness may b confused with fullness; a soft ful feeling nappa or unpholstery recip can employ acrylic elastomers t advantage.

Disadvantages to the retannag include the possibility of the tempe of the leather becoming somewha rubbery. In shoe manufacture ther is resistance of the wrinkles, at corners in construction, to be ironed out

The main disadvantage in we processing, however, is the sever effect on dyeing properties with a marked loss of colour yield and bleaching out on subsequen dyeings.

In application, the pH of the leather and the bath influence the behaviour of the products:

-- under pH 3.8 there is instability and risk of precipitation
-- over pH 5.0 there is an increase in viscocity and limited penetration

The usual procedure following neutralization (between pH 4.2-5.0) is to let the product run with the wet-blue for half an hour before addition of the other filling systems. Thus overloading and coarsening of the grain is avoided.

Control Points for consistent qualy:

- Uniform neutralization -- maximum pH 5.0
- Dilute before addition 1:4 with water
- Add 30 minutes before other anionic filling system.

rotein hydrolysate dispersions

Originally introduced as a selecve filler for the loose areas of the ide, experience has shown five easons for their popularity:

- enhanced soft, full-feel (without extra fatliquor)
- exceptionally level dyeings
- smooth tight grain
- uniform grain "break-up" after dry milling
- gain in surface area.

The above properties make this ype of retannage ideal for shoe appa, upholstery or garment eather.

Application is normally combined ith other retanning agents. It goes long way in overcoming the disdvantage of acrylic elastomers -that of rubbery handle. Unfortuately despite the additional polyeptide trummed into the leather, here is no improvement in dyeing rilliance or colour yield.

Control Point for consistent qualy:

Dilute with water 1:4 before addition to the drum.

olyurethane solutions/ ispersions

This family of products is at an arly developmental phase but hows promise of performing a simar function to the acrylic elastomrs, whilst overcoming the main disadvantage; the dyeing property. Trauebel and Goffin have shown that the PU chain appears to confer additional affinity towards anionic dyestuffs. It is to be hoped that continuing development in this direction will provide a reliable cost-effective solution to retanning and dyeing problems.

Conclusions

The processes before dyeing offer sufficient opportunities for controls to allow random quality variation to be eliminated. A detailed understanding of the mechanism of each process and the implementation of a system of Control Points will be significant steps towards the production of a standard substrate for the dyehouse.

Although retanning provides the opportunity to start adjusting leather quality in the direction needed by the consumer, it is evident that each system has its strengths and weaknesses. To summarize the newer systems which have proven themselves in regular bulk production.

METHYL UREA DERIVATIVES

Applied in acid medium to set the grain and prevent looseness. Little or no effect on dyeing properties.

REACTIVE UREA FORMALDEHYDE DERIVATIVES

Applied on neutralized leather together with polyphenolic tannins to increase filling effect, reduce stretch and produce a tight fine nap on suede. The combination has better dyeing properties than phenolic tannins alone.

ACRYLIC ELASTOMER SOLUTIONS

Applied on slightly neutralized leather for a change in temper. Used on softy leathers. Poor dyeing properties. Rubbery handle avoided by combination with protein hydrolysates.

PROTEIN HYDROLYSATES

Applied over wide pH range to promote softness, fullness, fine grain, uniform milled grain, very uniform level dyeings.

(Concluded)

(Courtesy: ***SANDOZ COLOUR CHRONICLE, July/Sep.1987*****)**

PLEASE
LOOK OUT
FOR THE
SPECIAL
ARTICLE
ON
"THE SOFTENING
OF LEATHER"
BY
DR.J.C.CROWTHER
IN THE NEXT
SUPPLEMENT
ON
LEATHER
PROCESSING

When it's Citric Acid it has to be Citurgia.

The name Citurgia is today synonymous with Citric Acid of the finest quality. Citurgia caters to more than just one need in more than just one industry. Besides the traditional usage of Citric Acid in food, soft drinks, confectionery and drugs, today the uses of Citric Acid extend to new areas:

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● **SELLACRON DYES** (1:2 Metal Complex dyes)	— High light fastness — Good covering and levelling power — Good all-round fastness properties
● **NEOLAN DYES** (1:1 Metal Complex dyes)	— Very good levelling properties — High light fastness Excellent wet fastness properties
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● **TANNESCO HN**	— For the retanning of soft leathers with tight, smooth grain
● **SELLASOL PR**	— Special filling syntan for all kinds of leathers.
● **SELLASOL-NG**	— Lightfast synthetic tanning agent with neutralising and buffering properties.
● **IRGATAN AS**	— Versatile replacement syntan, with good filling properties
● **IRGATAN RBL**	— White syntan with excellent light fastness for white leathers and pastel shades
AUXILIARIES	
● **INVASOL MW-IN**	— Fatliquor with good softening properties and excellent lightfastness
● **IRGAMIN SFC**	— Synthetic, lightfast fatliquor Imparts a waxy feel and supple handle to leathers
● **IRGAMIN C-IN & IRGAMIN 1281**	— Cationic fatliquors
● **SELLASOL TD**	— Anionic levelling and dispersing agent
● **TINOVETIN JU**	— Nonionic wetting and emulsifying agent
● **IRAGOL E-IN**	— Aqueous degreasing agent
● **REVERSAN LP-IN**	— Preservative with very good bactericidal and fungicidal properties
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LEATHER ABSTRACTS

CONTRIBUTION TOWARDS TANNING PROCEDURE -- FREE OF CHROME, M. Siegler, *Leather*, **189**, (4543) 115, 1987.

This paper brings a new contribution towards a tanning free of chrome procedure and describes different tanning agents which are likely to become the universal tanning accepted in the next century.

DRYING WITHOUT HEAT, J. Gilet, *J. Am. Leather Chem. Assoc.* **82,** 61, 1987.

The positive and negative efforts of the use of microwave energy to dry wet leather after setting out and aqueous base coat and prebase finishes. Some of the results show the following advantages over traditional methods.

-- No heating up and shrinking of the leather.
-- No hardening of the leather and elimination of subsequent staking and milling.
-- No energy consumed less than for conventional methods of drying.
-- Nett drying and conditioning time reduced from 5 days to 20 min.

HIGHER PERFORMANCE ACRYLIC RESINS FOR LEATHER II - ACRYLIC TOPCOATING SYSTEMS, J.J. Biles, N.J. DiCandilo and W.C. Prentiss, *J. Am. Leath. Chem. Assoc.* **82,** 65, 1987.

This paper describes a family of safe, non toxic acrylic emulsion topcoats offering a range of performance properties and favourable economics which are applicable to soften leathers of today. Some of the advantages includes recoatability and superior balance of thermoplasticity, dry sub-resistance, finish toughness and durability.

APPLICATION OF TRICHROMATIC DYEING SYSTEM IN LEATHER, L. Huszar, *Das Leder,* **38,** 111, 1987.

The trichromatic dyeing system provides new opportunities for simpler and more economical dyeing recipes. In this paper, a comparison is made between a traditional and a trichromatic dyeing system with the aid of colour measurement and electronic data processing. On the basis of the results, dyeing recipes have been calculated for running production and drum dyeings were carried out under bulk conditions using the trichromatic dyeing system.

THEORETICAL CONSIDERATIONS OF FATLIQUORING, G. Reids and H. Oertel, *Das Leder,* **38,** 41, 1987.

The greases, the greasing process and the properties of leathers influenced by fatliquor are systematically classified. It has been shown that an optimum fatliquoring proceeds within the interfibrous area. Further the greasing quantities encountered in practice are often more than those required theoretically and ways to optimise fatliquoring are demonstrated. An electroacoustical method to measure the softness of leathers, which is considerably influenced by greasing, is introduced.

ALTERATION TO CHROME TANNING -- PART III --EFFECT OF ORGANIC ACID ANIONS ON ALUMINIUM SULPHATE TANNAGE OF COLLAGEN, K.C. Montgomery, *J. Soc. Leather Tech. Chem.* **71,** 59, 1987.

Various aliphatic carboxylic acids and hydroxy acids, aromatic carboxylic acids and phenols have been evaluated as masking agents for potential application in a solo aluminium sulphate tannage to replace conventional chrome tanning. Lamb intestine was used as the source of collagen and tanning effectiveness was assessed primarily by measurement of shrinkage temperature. The importance of the presence and position of carboxyl and hydroxyl groups in both aliphatic and aromatic compounds has been demonstrated. The following agents were the most effective of those studied (based on the precipitation points of masked solutions):

Citrate > 2,3-dihydroxybenzoate > phthalate > gluconate = lactate = tartrate = ketomalonate = mucate = isocitrate = tartronate = mandelate.

In terms of shrinkage increments, the following agents were the most effective:

Ketomalonate = mucate > phthalate = DL-3,4-dihyroxymandelate > gallate.

STUDIES ON THE SHRINKAGE TEMPERATURE AND MECHANICAL PROPERTIES OF Gamma-IRRADIATED SHEEP SKIN SPLITS, T.M. Van Gulik and P.J. Klopper, *J. Soc. Leath. Tech. Chem.* **71,** 75, 1987.

The effects of ionising in addition of the Ts and the other mechanical properties of sheep resin split which had undergone beamhouse processes were studied. Gamma radiation was employed. The irradiation was carried out in dry and wet conditions, the latter was conducted under conditions of reduced oxygen tension. The splits were tanned with glutaraldehyde prior to irradiation. The 20 Mrad irradiated specimen had controlled to 8% of its original size and had become extremely brittle. The 2.5 Mrad dry irradiation decreased the tensile strength of an untanned specimen to 23% of its original value whereas wet irradiation resulted in a decrease of 50%. With the irradiated gluteraldehyde tanned specimens, a dose related, exponential decrease in both Ts and tensile strength was substantiated.

BIOTECHNOLOGY IN LEATHER MAKING -- A SIMONCINE, *World Leather*, 1 (1), 60, 1987

This paper reviews current uses of enzymes in leather making and anticipates the likely contribution of biotechnology in future leather processing.

Soaking: Enzymes make it possible to shorten production time considerably. They solubilize and remove the inter fibriller proteins, make rehydration of the skins wasy and avoid 'fluid grain'.

Depilation: By a technique using lime, sulphide and enzyme complete unhairing and adequate skin opening-up can be achieved in less than six hours instead of the normal 18-20 hours. But still a satisfactory treatment, that is purely enzymatic is not achieved.

Bating: In this area, the direct and indirect use of enzymes exerting a mainly proteolytic action has been going on for the longest time.

Degreasing: This is a potential area for enzymatic processes which would eliminate the solvents and surface active agents from the effluent.

Effluent Treatment: A number of new areas where enzymes may be utilised to decrease a tannery's pollution load is foreseen. These include, leaching chrome from tannery sludge, recovery of fats and proteins from trimmings and fleshings and eliminating phenols from waste waters.

ELECTRON BEAM IRRADIATION IN HIDE PRESERVATION, David Bailey, *World Leather*, **1**, (1), 60, 1987.

The use of electron beam irradiation is now commercially viable as a means of hide preservation. By a chemical treatment of hides, the level of electron beam irradiation needed for complete microbial control of fresh hides is lowered. Crust and finished leathers made from irradiated hides are generally indistinguishable from the controls in subjective tests and with only a slight loss of tensile strength in the leathers made from irradiated hides.

THE SOFTENING OF LEATHER, J.C. Crowther, *Colour Chronicle*, Oct/Dec. 12, 1987.

The softening of leather depends on the following factors:

Correct preparation of well separated fibres; careful preparation of fatliquor emulsions; correct selection of lubricating oils, control of fat liquor penetration and deposition; suitable conditioning and relaxing and adequate staking and/or dry milling. The consequences of the physico chemistry of emulsions on the practical application of fat liquors are also discussed.

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NEW PRODUCTS

LIQUID AND GRANULATE SYSTEM

Tennesco HN, offered by Ciba-Geigy is a chrome containing syntan in liquid and granulate forms. The liquid tan is easier to disperse than solid forms in partly or completely computer-controlled equipment. It has a lower electrolyte content than powder products and therefore does not contaminate floats and effluent so heavily, with neutral salts.

Leather, **187,** 1987.

FROM BAYER AG

Euderm Filler VF

This product is thixotropic and improves the flow of the finish coats and is particularly important for purely aqueous top coats and effective finishes which have poor flow compared to organic lacquers. It makes the finish coat dry and prevents tackiness on plating and staking. It also improves the rub fastness of the finished leather and gives it a pleasant, dry handle.

Enderm Nappa Soft SA

It is new auxiliary primarily for the finishing of corrected grain furniture upholstery leather. It has a combination of balanced plasticising and drying components which enables it to level leather without loading the grain and giving it a plasticky appearance. Leathers treated with this product have excellent dry drumming properties and are similar in appearance to full grain leather.

Enderm Fix PMA

This is a valuable addition to the range of crosslinking agents for the aqueous systems. It is suitable for all polymer systems including casein and improves nearly all the fastness properties of the leather.

Bayctron CP

This is a self-basifying chrome tanning material with a chrome oxide content of approximately 7%. It aids fixation of the chrome and thus improves the chrome exhaustion of the residual floats. It is always used in combination with conventional chrome tanning materials.

Xeroderm DS

This is a new kind of water repellant based on paraffin and polysiloxane for water proofing, in the drum. It has a softening effect and gives anything from a water repellant effect to a high degree of water proofness on different types of leather.

Xeroderm WF

This is an aqueous dispersion of a fluoroalkyl acrylate polymer containing about 15% acetone. It contains 30% solids and has excellent light fastness. It improves the water and oil repellancy of leather surface and gives the leather a very pleasant and natural handle. It can be applied by spraying, paddling at diluted water in the drum.

Preventol CR

This is a new and lightly effective preservative based on benzothiazole derivative, and free from organometallic and phenolic compounds. It is a liquid freely mixable with water and has broad spectrum of microbial activity especially against fungi.

Leather, 189, September 1987.

LEUKOTAN FW-46

An acrylic systan is introduced by Rhom and Hass Co., USA. It is a functional replacement for titanium dioxide with outstanding filling and hiding properties. This system upgrades without firming or deadening and it permits to make a lighter weight white leather as well as consistent pastels.

World Leather, **1,** (1), 1987.

DERMACOR DYES

Sandoz has introduced a new dye range, the Dermacor dyes. These dyes form a compact range with six readily combinable elements. They allow the most important shade region to be covered with minimum dye storage space. This balanced dyeing behaviour makes them suitable for calorimetric measurements of samples without time consuming sampling being necessary.

Leathers, **189,** (4547), 1987.

PRODUCTS FROM BASF

Corial Finish ECL is a new component polyurethane lacquer and it forms a dry elastic film and is particularly suitable as a finish coat for leather to be milled. It is normally diluted with 200% solvent, Corial Diluent A. Corial E.Y. Finish KN a new water thinnable lacquer which flows well and imparts a high gloss finish with good fastness properties to the leather. It is normally diluted with 200% water.

Luganil Black SL Liquid is a metal complex dye yielding a uniform relatively bluish shade. It has excellent level of fastness properties. Lepton Red Violet is a very brilliant, transparent, strongly bluish red dye. It is fast to migration and solvents and has outstanding fastness to light.

Leather, 189, 1987

AUTOMATIC SPRAYING GUN

The new automatic spraying gun A 10, introduced by Charvo is designed for use as automatic spraying machines. It has the following advantages -- hard cost interchangeable fluid heads, stainless steel nozzle and needle, large air passage ways, no special tools required for dismantling gun and wasily cleaned and efficient spray system.

Leather, 189, 1987

ATLASOL KEP

The newest synthetic cationic fatliquor introuced by Atlas Refinery Inc., Newark, NJ, USA is designed to improve the softness, tensile and tear strength of leather during the chrome tanning and retanning stages. It also helps an even distribution of fat and chrome throughout the cross section and prevents the leather from becoming entangled in a short flout. Further it has a virtually unlimited storage stability and is compatible with all cationic and non-ionic materials.

NEW POLYURETHANE ADHESIVE

A new polyurethane adhesive, 22005 has been introduced by Swift Adhesives of Douners Grove, USA. It allows for bonding of difficult substrates such as synthetic foam, plasticized vinyl, polystyrene, polyolefins, synthetic textiles and non-ovens. It remains plaiable after bonding and it is to be applied to only one of the substrates to be bonded.

Foodware Manufacturing, **180** (5), 1987

ALPHA BLADE

Alpha - a brand new spiral knife introduced by Wilson Knife, Liverpool is a bonded bi-metallic knife using a newly specified alloy steel on a soft steel base. It achieves clean shaving at high speeds as well as long service life. It produces a fine grained very hard and completely uniform cutting face with great wear resistance. The uniformity of the cutting face structure extends right down to the base allowing maximum usage of the cutting cylinder and hence greater blade life. Further it has a high degree of dimensional stability thus making it easy to refit cylinders.

World Leathers, **1**, 1, 1987

PRESERVATION OF RAW SKINS

ATIE of Mazamet, France have developed a new process comprising a special through feed salting machine, a dehumidification drier and a vating press. An intiial salting of skins with a fine sea salt with certain added chemicals is involved. This is followed by drying at temperatures between 25-30°C using specially developed equipment. The saline mixture prevents oxidation of the skins and comes to the surface on drying, allowing higher temperatures than normal to be operated. The mixture also prevents decay where any minor folding over occurs. This process not only accelerates drying but also provides constant conditions, thus producing a uniformly high quality raw material.

World Leathers, 1, 1, 1987

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LEATHER NEWS -- INDIAN

31% INCREASE IN LEATHER EXPORT

Leather exports have maintained the impressive performance with a 31 per cent increase in the first five months of the current year over the corresponding period of last year.

According to Mr. M. Mohamed Hashim, Chairman, Council for Leather Exports (CLE), exports during the five-month period topped Rs. 433.98 crores as against Rs. 330.08 crores in the previous year.

Presenting the annual report of the Council at its general body meeting recently at Madras he said given the trend, exports could easily cross the Rs. 1100 crore mark in 1987-88. Another encouraging feature was the rising share of value-added products in the total exports. Indications were that products would account for nearly 60 per cent of the overall figure projected for the year.

Mr. Hashim said the US, the USSR, West Germany, the UK, France and Japan continued to be the major markets for Indian leather and leather products. In the US, the demand for import of footwear and leather garments was expected to be strong this year also. Especially in garments, the Indian exports stood to gain in the wake of the uncertain political situation, coupled with the rising wage levels, in South Korea.

In the case of West Germany, while the demand for shoe uppers promised to be quite strong in the near future, Mr. Hashim feared that the increasing cost of the product within India might eventually result in the buyers looking for other sources. As for garmets, the market was expected to continue as the single largest importer of the item from India.

He was happy to note that there was a surge in the demand for Indian leather products in Japan despite the fact that Japanese were slow decision-makers. In the USSR and the GDR, the demand for Indian leather products was still high and study had revealed that Indian shoe-uppers would continue to attract the attention of the buyers in those countries for some more years.

Mr. Hashim stressed the need to improve the quality of the products and the productivity of labour. He pointed out that the country had almost lost its advantage in terms of the low prices of leather. Now, the prices of good quality leather within the country was almost equal to international prices.

He felt that the low productivity was mainly due to inadequate modernisation efforts, poor production organisation and lack of training. Besides, the approach to conserving leather by making optimum use of it had not been encouraging.

But this was a disturbing phenomenon considering that the international market was becoming increasingly competitive in terms of quality and prices. Therefore, he appealed to the industry to make necessary investments in plant and machinery and impart training to professional and technical personnel.

Mr. Hashim regretted that though the Government had allowed foreign collaboration for setting up manufacturing facilities for various components and consumables, not many people had come forward to utilise the opportunity. Similarly, the country did not have facilities for manufacture of quality machines for making footwear and other leather products.

In this context, he urged the Government that in the case of the investments being high, it should motivate large houses or public sector establishments to enter the field and set up factories.

Referring to the severe drought the country was facing, Mr. Hashim observed that because of the lack of water and fodder, the death rate of animals in the rural areas was bound to go up. The slaughter rate might also increase resulting in abundant availability of leather this year. But this was only a short-term prospect.

In the long run, however, particularly in the next two years, the country would face substantial shortage of hides and skins, to offset the situation, the leather industry should take maximum advantage of the Government policy to allow duty free import of hides and skins. Other sources of supply should also be located to ensure that the plants were run to full capacity in the years of difficulty, he added.

PLAN TO BOOST LEATHER EXPORTS

The Council for Leather Exports has drawn up a three-year marketing plan (1987-90) for taking the country's exports from Rs. 930 crores in 1986-87 to Rs. 1378 crores by 1989-90.

These targets are likely to be revised upward to around Rs. 1500 crores by the plan-end on account of spectacular increase in export of leather products, footwear and footwear components and finished leather in 1986-87 and nearly 35 per cent rise in exports to Rs. 364.23 crores during first four months of the current financial year as against Rs. 264.48 crores in the corresponding period of last year.

The plan mainly aims at achieving four-fold objectives of having a larger share of world markets; higher value realisation; development of new markets and diversification of commodity composition in existing important markets. The major thrust in the plan will be on expanding export trade in leather and leather products in selected thrust markets. These countries are USSR, West Germany, the USA, Italy, the UK, GDR, France and Japan. Another country shows promise is Australia. No doubt, currently, they have a number of import restrictions but it is expected that there would soon be some relaxations and Australia may also be included in the marketing plan.

A study of the plan paper shows that these eight countries together accounted for 69.72 per cent of total leather exports in 1985-86. In 1986-87 their share rose to 74.6 per cent. Assuming a growth rate of 15 per cent per annum for each country, the Council intends to raise their share further to 77.54 per cent in 1987-88 and to 78.23 per cent in 1989-90. However, the percentage share of different products will vary from year to year in view of the trade anticipated in these countries. The major export markets for Indian leather industry have been changing fast, whereas in the last decade Italy, the UK and France were major importers of Indian semi-finished and finished leather, the 80s have witnessed the U.S., West Germany, Denmark and some of the other small European countries emerging as India's markets for leather garments, hand bags and footwear. In socialist bloc countries, USSR and GDR have been major buyers of leather products particularly footwear components and leather for shoe uppers.

The plan paper pointed out that countries like Italy, Hong Kong and South Korea are important for leather, semi-processed and finished. These countries are themselves major manufacturers of leather products for world markets and, therefore, it is unlikely that they would import from India leather products in any significant quantity. However, their import of leather will continue to be sizeable. Besides, Denmark and Netherlands are relatively small markets and these countries normally participate in all leather fairs in Europe and therefore whatever efforts India makes in major European markets will apply to these countries.

Accordingly, these five countries have been left out of the marketing strategy. The share of the five countries excluded from the plan, viz. Italy, Hong Kong, South Korea, Netherlands and Denmark was 18.75 per cent during 1985-86 and this share is unlikely to fall in the years to come. The plan paper observed that exports to USSR and GDR are regulated by bilateral trade plans. In order to achieve the projected targets that the council has suggested that the trade plans should make adequate provisions, constant monitoring of exports inclusion of items like leather footwear (such as dress shoes and casual wear) for both ladies and gents and leather garments and participation in at least one fair in each of these countries every year.

ILPA FOR SPARES IMPORT AT CONCESSIONAL RATES

The country's leather products manufacturers have suggested to the Government to refashion the yardstick for determining import duty for spare parts required for leather products macinery. In a proposal submitted sometime ago, the leather products makers have suggested that the quantum of import duty on spare parts be fixed by treating them as components for the machinery as a whole. As they view it, the present system of slapping import duty on spare parts on an individually classified basis of functioning of the corresponding categories of machinery is leading to high tax incidence.

Mr. S.S. Sawhney, President, Indian Leather Products' Association (ILPA) said that it was true the Government had permitted import of 31 new machines for the industry under reduced duty. But the factor of stiff tax load on spares was negating all advantages of the facility.

In ILPA's view, spare parts should be allowed to be imported at concessional rates. Otherwise, the present tax incidence would throw a spanner into the process of modernisation now under way in the domestic leather industry he said. The leather products makers had also pointed out that the present ten per cent limitation in rep licences was also holding up the import of metallic pullers, zips and snap fastners, all classified as essential embellishments.

The current percentage limitation relating to the embellishments should be dispensed within the interest of the foreign exchange earning-industry, they said. ILPA had also brought to the Government's attention what it described as the harassment of exporters using metallic and non-metallic embellishments at the hands of customs authorities. Although the relevant Government notifications were unambiguous, customs authorities in some parts of the country were harassing exporters, especially those using rivets, by interpretting the nomenclature of some of these embellishments.

Meanwhile, ILPA, Mr.Sawhney said, had asked all exporters of leather products to ensure strict utilisation of the incentives the Government had lately evolved in the interest of export growth. The recent Government step permitting import of metallic embellishments used by the leather products sector at a reduced imports duty of 40 per cent was heartening, he said. ILPA had been pressing for liberalisation of import of such inputs for a longtime, he said.

Various metallic and non-metallic embellishments such as buckles, rings, decorative pieces, magnetic locks and buttons, rivets and the likes were required for manufacture of value-added items like handbags, wallets, garmets, footwear and lugageware. Without these embellishments, Indian leather products would not enjoy much saleabilty in the west ruled by the trends of high fashion.

ILPA'S PLEA TO HIKE IMPORT LIMIT

Indian Leather Products Association (ILPA) has urged the government to revise the limit of duty-free import of leather products samples to a level of Rs. 5000 from the current level of Rs. 1,000.

In a press release issued by the Association, Mr. S.S. Sawhney, President, said that the limit was not revised for more than a decade. Raising the limit was a necessary step towards export promotion of value added leather products, he said.

JAPANESE TANNERS IN INDIA TO EXPLORE LEATHER MARKET

A business mission sponsored by the Japanese Tanners Council has arrived here to explore the possibilities of buying finished leather from India.

The mission members told newsmen that the Japanese tanneries were unable to expand their capacities to meet the growing demand for leather because of strict enforcement of pollution control regulations.

Imports, therefore, have become necessary for bridging the gap between domestic demands and supply. The Japanese government had allowed the import of wet blues free of duty and was willing to cut duties on other types of leather over the next few years. In the circumstances, leather imports have become a distinct possibility.

The eight-member mission led by Mr. Kenji Maruno of Sanwa Leather Company Limited held discussions with a group of leather exporters along with the chairman of the Council for the Leather Exports, Mr. Hashim and Mr. A. Sahasranaman, Executive Director of CLE.

Mr. Hashim informed the mission that Indian Government's policy was to export more value added items from India so that the product exports constituted 90 per cent of the total exports by 1990. With the finished leather exports down to just 10 per cent and stoppage of semi-finished leather exports by that year any long-term business deal could be only in product exports.

STC BAGS RS. 12 CRORE G.D.R. ORDER FOR SHOE UPPERS

The State Trading Corporation (STC) has secured an export order, valued at Rs. 12.07 crores for leather shoe uppers to the German Democratic Republic (GDR). The shoe upper pairs to be supplied to Interpelz, the GDR buying agency, totals 10.08 lakh pairs. The supplies will be made between November, 1987 and July 1988.

STC hopes to sign further contracts with Interpelz in March next year and thereafter another deal will be finalished, according to the STC sources. As a result, the corporation expects an export turnover for shoe uppers to GDR worth Rs. 25 crores in 1988. In the current calender year, such exports are expected to be around Rs. 23.5 crores.

The latest agreement was signed in New Delhi on October 29 by Mr. A.K. Sen, Executive Director of STC and Dr. K.H. Dankert, Director General of Interpelz.

The shoe uppers, under this contract, will be manufactured by small scale units located in Delhi, Madras, Agra and Kanpur. GDR buyers are providing technical advisory services to these units for upgrading the quality of shoe uppers, according to STC release.

US FOOTWEAR MAKERS' MOVE CAUSES CONCERN

Footwear manufacturers in the US are seeking legislative measures to cut back imports which, they fear, will eventually wipe out the domestic industry. The move should be of concern to Indian exporters.

According to reports, the US manufacturers are pushing a new quota Bill, the textile and apparel trade act, 1987 (S-549), in their attempt to check the 'load' of imports.

The Bill, if gets through, will freeze the footwear imports to the last year's levels which was one billion pairs. According to a spokesman of the industry, who gave an account of the prevailing situation before the Senate Finance Committee recently, imports had increased by nearly 100 million pairs a year over the last six years.

In other words, imports which constituted 51 per cent of the total US market till six years ago, now formed 81 per cent of the market.

Besides, domestic production had been cut to half in the last ten years with the consequential fall in employment in the footwear industry by 35 per cent during the past five years. Earlier this year, the ways and means committee of the house of Representatives had held a hearing on a similar Bill, H.R. 1154, and a vote on the Bill is expected soon.

It seeks not only to keep footwear imports at the 1986 levels, but also puts a ceiling on textiles and apparels import increase at one per cent a year.

The move being made by the US manufacturers has grave implications for India as more than 25 per cent of its total footwear exports at present is to the US making it the largest single importer of Indian footwear. Also, a substantial increase in the footwear export to the US in the coming years forms an important part of the long-term leather export strategy of the country.

In 1986-87, the footwear export to the US amounted to Rs. 25.9 crores which was a quantum leap over the previous year's level of Rs. 8.6 crores. The total export of footwears from the country last year topped Rs. 80.4 crores.

LEATHER NEWS -- FOREIGN

WORLD'S LARGEST SHOE

The world's largest shoe is made in Madrid measuring 1.3 meters and weighing 72 kilos. It took 94 hours to complete this work using 1310 needles for 1038 stitches and 371 studs and the cost is estimated about US $ 800. (*Shoe & Leather News*, August 1987).

LEATHER DOLLS OF TAIWAN

The dolls of Chan hu-miao are so lifelike that any viewer's reaction is that 'they cannot be made of leather'. Leathers are scraped paper thin, soaked and stretched over hand carved plaster moulds to dry. While drying, designs are brought out in detail. After drying, the dolls are carefully removed from the mould and treated with a chemical compound to retain its shape. (*Leather*, February, 1987).

US IMPORTS TOP 100 M

Footwear imports topped the 100 million pair mark for the first time. According to the latest Commerce Department figures, footwear imports totalled 102,798,000 pairs in February 1987, an increase of 17.5% over February 1986. (*Footwear Digest International*, July/August 1987).

HIDE, SKIN RESOURCES IN 1985

USA, Canada are the main raw stock suppliers and their shoe imports exceed their production.

USSR and East Europe are raw stock importers and use all their leather production.

Argentina utilises the whole of her bill for leather production (mainly wet blue/chrome crust) but exports 3/5ths of it as leather.

Brazil has a leather deficiency (mainly wet blue or chrome crust) and exports the greater share of her shoe production.

Mexico is an importer of raw stock.

India relies on her raw stock resources for her bovine leather and footwear production.

Korea is a major importer of raw hides and hide leather stock (wet blue and crust mainly) and exports bulk of her shoe production

China is an importer of hides.

Japan is an importer of hides and a major exporter of hide leather.

Australia/New Zealand are raw stock suppliers both in the raw and as wet blue/crust.

Hong Kong is an importer and exporter of leather with little production of raw hides and of leather footwear. (*Leather*, July 1987).

WET BLUE EXPORT BANNED

The Bangladesh Government in the new export policy has announced that exports of wet blue will be banned from July 1, 1990. At present, to encourage finished leather, export performance benefit has been withdrawn for wet-blue exports. However, duty drawback facilities will remain as wet blue. The Government is to give liberal credit facilities to wet blue exporters for modernising their factories for crust and finished leather production. (*Leather*, **189**, 1987).

RAW MATERIALS

CATTLE & CALVES

United States: The expected further fall in cattle slaughterings has been delayed.

Canada: Slightly reduced slaughterings in 1986, particularly of cows and heifers and improved prospects suggest a slowing in the rate of herd liquidation -- possibly prior to re-expansion during the current year and into 1988. A sharper decline in slaughtering is forecast for 1987.

Argentina: Slaughterings have been maintained at a relatively high level in the second half of 1986. The latest forecast for 1987 shows a reduction to 12.7 m. -- presumably to allow for some herd rebuilding.

Brazil: Cattle slaughterings dropped sharply in 1986 by about 11% to 9.1m head -- a result of Government freeze in beef prices and a programme of compulsory purchase of under utilised land.

Australia: Bovine slaughterings showed a 10% expansion in 1986. A modest 2% expansion of cattle stocks is being forecast for 1988.

New Zealand: Due to the meat workers strike, the slaughterings remained practically unchanged from 1984-85.

Europe: Cattle numbers in the European Community fell by 1.7% in the year to mid 1986 and available figures suggest that there was little change from those of 1985.

Soviet Union: Slaughterings rose by 2.8% to 40.9m. head in 1986.

SHEEPS & LAMBS

New Zealand: Total slaughterings upto September 1986 dropped by 18%, those of sheep (down as much as 38% mainly due to very low mutton prices.

Australia: Sheep slauterings rose by 20.7% to 14.2 m. and lamb slaughterings fell by 2.4% to 18.3m.

Europe: Reduced killings in all the major EEC producers, bringing an overall decline of 3.5%.

United States: Sheep inventory has been falling since 1982. (*Leather*, **189**, (1987)).

Environment

DUTCH PUSH TOWARDS BAN ON OCEAN INCINERATION

The Netherlands is now heading towards a complete ban on the incineration of toxic wastes at sea by the end of the decade — with or without support from other EEC member states.

The Dutch government has said it expects that the Netherlands will not need ocean incineration after 1990. Currently some 100,000 ton/year of toxic waste (mainly chlorinated hydrocarbons) are burned at sea in Dutch territorial waters. On land, around 400,000 ton of waste is awaiting disposal, but only around 5 per cent of this is produced by Dutch industry.

For waste originating from Dutch sources, the government says there is enough incineration capacity on land at Akzo Zout Chemie and AVR-Chemie in Rotterdam. Nevertheless, the government still conforms to the Oslo Convention which calls for a final decision about sea incineration to be made internationally before 1990.

However, the Dutch chemical industries association VNCI is opposed to the government decision. VNCI has called the move "cynical" and said the government wants to "keep its own back yard clean" and appears unwilling to help solve the waste problems of other countries.

VNCI states that incineration at sea must continue until the problem of wastes, particularly polychlorinated biphenyls (PCBs) is solved by reduction at source or by recycling and incineration facilities on land.

Meanwhile, a new row is brewing over the burning of chemical wastes at sea. Ocean Combustion Service (OCS), the controversial sea incineration firm, has been granted permission by the Dutch ministry of waterways and public works to burn Spanish waste in Dutch waters.

Previously OCS's incineration ship Vulcanus II has been forbidden to sail from Antwerp because it did not have an import licence for the waste. The ship is understood to be carrying 1,200 ton of toxic waste loaded, at Santander, Spain ,and an unknown amount loaded at Le Havre, France.

A spokesman for the Dutch ministry said that he considers the Spanish waste as a "transit", and authorities were wrong to hold it at Antwerp for not having an import licence. Greenpeace, the environmental pressure group, has said it will keep up its campaign to stop OCS burning the waste in the North Sea. The environment group's own vessel Sirius is now on standby at Hull in the UK and will intercept the Vulcanus II if OCS begins any burning.

Next month Greenpeace will be calling on delegates at the conference of North Sea ministers to support the Nordic nations' initiative for tighter controls on ocean dumping and an end to all incineration at sea by 1990.

HENKEL REFUTES SURFACTANTS CLAIMS

Henkel has hit back at the controversial West German television programme Monitor which has claimed that the surfactant Texapon sold by the Dusseldorf-based chemical group is a cytotoxin. Texapon is used as a foaming agent in toothpaste.

In an advertisement campaign, Henkel argues that Texapon (sodium lauryl sulphate or Nals), is not a cytotoxin and does not damage gums as claimed in two editions of Monitor. Although the programme maintains that studies have shown that Nals causes gum damage, Henkel points to a number of studies which show that the substance is harmless.

According to Henkel, "There is no surfactant in use that has been tested as thoroughly from a toxicological standpoint as experiments televised by Moni- Nals." The company dismissed tor as "unscientific" and also accused the programme's journalists of misquoting a company study.

SANDOZ TO PAY COMPENSATION

Sandoz of Switzerland has agreed to pay France compensation of FF46m ($7.4m) for damage resulting from a leak of chemicals into the Rhine last November. Some FF11m will be paid to an association in Alsace, a further FF11m will be received by a number of leisure groups and FF7m will go to the French government directly. Some FF17m will be used to analyse and restore the Rhine's ecosystem.

COMPUTERS REDUCE ANIMAL TESTING

Three research projects sponsored by the West German ministry of research and technology have concluded that the use of computers can reduce the number of animal tests used in the pharmaceutical industry by more than one-third. With the aid of computerized molecular modelling experiments scientists have so far synthesized three drugs.

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We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such they are not FIRM PRICES as between a buyer and a seller. The prices are published only with a view to giving some ideas of market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

Chemicals Dull

The expected picking up of sales after Diwali in major chemical items remained unfullfilled. Some items like phenol, MEK, Titanium dioxide ruled firm with shortage of ready goods.

It was reported that the HOC phenol plant was working below capacity resulting in a shortage of ready goods The shortage in Octanol continued resulting higher rates of various plastisizers.

MPD was in good demand in the dyes sector. Other dyes intermediates and dyes ruled steady.

(Prices as on 5th November 1987)

INDUSTRIAL CHEMICALS	**Per kg.**
Ammonium sulphate	2.00
Ammonium phosphate (Mono)	14.50
Ammonium phosphate (DI)	12.00
Ammonium carbonate (DI)	17.00
Ammonium bicarbonate	4.75
Ammonium chloride	5.50
Ammonium nitrate	4.50
Arsenic white powder	21.00
Acrylamide	57.00
Barium carbonate	6.00
Bleaching powder (33% Cl)	4.00
Borax (Granular)	14.00
Borax (Powder)	15.50
Boric acid (Tech.)	22.00
Bisphenol-A	58.00
Butyl carbitol	35.00
Caustic soda (Flakes)	7.50
Caustic soda (Solid)	7.75
Caustic soda (Lye)	6.00
Calcium chloride 70% (solid)	3.25
Calcium chloride 75-80% (fused)	3.50
Calcium chloride 96% (Anhydrous)	5.00
Calcium carbonate (PPT)	3.00
Calcium carbonate (Activated)	3.55
Camphor (Indian)	85.00
Cresylic acid	49.00
Cream of Tartar (Tech.)	64.00
Citric acid (Belgium)	40.00
Citric acid Indian	39.00
Copper sulphate	15.25
Chromic acid	40.00
Cyanuric chloride	95.00
Cobalt oxide	280.00
Carbitol	52.00
Dicalcium phosphate (Anhydrous)	16.00
Ferric chloride (Lumps)	5.75
Ethylene urea	66.00
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Glue sheets	6.75
Gonsenol GH*	74.00

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Lithopone	35.00
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Menthol crystal (Flakes)	185+Ex.+ST
Menthol bold	205+Ex.+ST
Menthol crystal bold	245+Ex.+ST
Magnesium carbonate (Japan)	16.00
Magnesium carbonate (Indian)	15.00
Maleic Anhydride (per kg.)	42.00
Mercury (75 lbs)	5,400.00
Nickel chloride	55.00
Oxalic acid	22.00
Peppermint oil (Rectified)	90+Ex.+ST
Potassium carbonate (Indian)	19.00
Potassium carbonate (Imported)	21.00
Potassium bichromate	22.00
Potassium phosphate (Mono)	14.00
Potassium phosphate (Di)	14.00
Polyvinyl alcohol (No. 117)	88.00
Polyvinyl alcohol (No. 173)	88.00
Polyvinyl alcohol (No. 208)	89.00
Paraformaldehyde	15.30
Phthalic anhydride 96%	23.50
Pentaerythritol	63.50
Paraffin wax	13.75
Rangolite (German)	60.00
Rangolite (Czech.)	42.00
Sodium sulphate (Fine)	4.00
Sodium sulphate (Coarse)	3.80
Sodium sulphide 50-52% (Flakes)	8.00
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Sodium sulphide pure (Flakes)	[illegible]
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Sodium bicarbonate	5.25
Sodium bisulphite	4.50
Sodium silicate	3.00
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Sodium alginate	165+ST
Titanium Dioxide (Anatase)	51+ST
Titanium Dioxide (Rutile — RCR.)	67+ST
Tartaric acid (Crystal)	94.00
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Acetic Acid (Glacial)	12.75
Acetic Anhydride	28.00
Acetone	21.50
Adipic Acid	50.00
Aceto Acetanilide	60.00
Aniline Oil	44.75
Benzoate Plasticiser	33.00
Butyl Acetate	42.00
Butyl stearate	36.00
Butyl Acrylate	61+ST
Butanol	47.00
Benzyl chloride	24.00
Benzo trichloride	16.00
Benzoyl chloride	[illegible]
Benzyl Alcohol ([illegible])	36.00
Bromine Liquid	42.00
Chloroform	24.60
Carbon Tetrachloride	11.00
Cyclohexanone	38.00
Cyclohexanol	44.00
Diacetone	27.50
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Dioctyl Phthalate	45.00
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Dimethyl Phthalate	28.60
Dioctyl Adipate	52.00
Dibutyl Adipate	42.[illegible]
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Dimethylamine 60%	14.00
Ethyl Acetate	24.00
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Ethylene Dichloride	11.00
Ethylene Glycol	26.00
Formic Acid (Imp.)	32+ST
Formaldehyde	5.60
Glycerine (CP)	50.00
Glycerine (IW)	49.00
Hydrogen peroxide 50%	25.75
Iso Propyl Alcohol	20.50
Iso Butyl Alcohol	28.00
Monoethanolamine	46.50
Morpholine (Indian)	65.00
Melamine	33.00
Methyl Ethyl Ketone	35.00
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OXALIC ACID (Substitute)
SORBITOL
METHANOL (Distilled)
SODIUM NITRATE
GLYOXAL — 40%
MALEIC ANHYDRIDE
TRI ETHYL AMINE
OCTANOL

Please Contact:

BEEKAY ENTERPRISES

M-1, Faiz-E-Qutbi, 375, Narsinatha Street, Bombay-400 009
Phone: 349080/345011 Resi: 512 1572/512 [illegible]

Bombay Dyes Markets

(Prices as on 5th November 1987)

ACID COLOUR	Per Kg
Acid Violet 4BS	143.00
Acid Maroon V	110.00
Acid Orange II	77.80
Acid Orange IIY	63.05
Acid Red A	107.25
Crosein Scarlet MOG	155.00
Acid Scarlet 3R	99.90
Acid Red 38N	135.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Green V	330.00
Acid Patent Blue AS	250.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	121.95
Acid Black BX	98.40
Acid Black Wax	135.50
Procinil Yellow GS (I.C.I., UK)	265.00
Procinil Red GS (I.C.I., UK)	530.00
Procinil Blue RS (I.C.I., UK)	315.00
Procinil Scarlet G (I.C.I., UK)	600.00
Procinil Orange G (I.C.I., UK)	250.00
Procinil Rubine (I.C.I., UK)	550.00

DIRECT COLOURS	Per Kg
Yellow 3GX	88.10
Sun Yellow RCH	124.40
Fast Yellow GCH	141.15
Yellow CFG Hly. Conc.	312.00
Fast Yellow GS	111.65
Fast Yellow CHRS	95.45
Viscose Orange A	166.15
Fast Orange GR	133.75
Red	96.90
Dark Tan	78.25
Red IIR	72.55
Red 4B	169.10
Bordeaux BW	132.30
Fast Scarlet 4BS	166.55
Red 12B	170.55
Bordeux Hly Conc.	194.00
Cotton Red N	117.05
Brill. Fast Helio B	278.00
Brill. Fast Helio 2B	297.00
Brill. Fast Helio 2RS	136.2[illegible]
Brill. Fast Helio BS	116.10
Brill. Violet Extra	126.40
Blue 2B	86.60
Blue G	170.50
Sky Blue FB	188.25
Copper Blue GR	147.00
Fast Greenish Blue GL	114.60
Developed Black BT	116.10
Blue NB-2B	300.20
Blue NB-2BC	185.30
Developed Black NB-BH5	185.30
Green B	111.65
Green NB-B	188.25
Green 2B-N	188.25
Brown MR	154.40
Brown CN	107.25
Golden Brown G	140.35
Catechin G	120.50
Omega Tan	126.40
Catechin GS	102.80
Black E Hly Conc.	142.60
Black E Extra Hly Conc.	142.60
Black NB-ER Hly. Conc.	310.50

DISPERSOL COLOURS	Per Kg
Yellow 6G Powder	143.80
Red B 3B Powder	247.80
Red B 2B Powder	323.20
Red CB Powder	439.15
Red D2B Powder	477.40
Violet C 4R	521.90
Blue BG Powder	235.45
Blue BN Powder	103.75
Blue D 2R Powder	476.25
Navy BT Powder	243.90
Blue B 2G Powder	210.20
Black BT Powder	162.60
Blue BR Powder	390.20
Yellow 7GL	338.60
Yellow 5RX	218.80
Yellow 3G	367.25
Yellow	140.00
Yellow AL	135.30
Yellow Brown REL	247.50
Yellow FFL	463.60
Gold Yellow GG	259.70
Pink REL	247.00
Red REL	468.65
Red 2B	327.40
Red FB	324.20
Red Violet FBL	469.85
Orange 3R	196.65
Violet 3R	280.60
Violet 6R	485.75
Violet RL	275.45
Scarlet RR	214.85
Rubine 3B	223.05
Rubine CB	364.90
Blue GL	318.95
Blue BGF	636.55
Navy Blue RE	270.40
Brown 3REL	200.40
Black GEL	324.20
Dark Brown 3B	317.40

BASE COLOURS	Per Kg
Fast Yellow GC	80.20
Fast Orange GC	135.45
Fast Scarlet R	166.80
Fast Scarlet RC	126.65
Fast Scarlet RCR	99.05
Fast Scarlet G	121.65
Fast Scarlet GN	91.50
Fast Scarlet GG	72.70
Fast Scarlet GGS	72.70
Fast Red B	203.20
Fast Red RC	119.15
Fast Red R Flakes	149.25
Fast Red TR	166.80
Fast Red TR Oil	183.15
Fast Red RL	237.10
Fast Red KB Oil	201.95
Fast Bordeaux GP	201.95
Fast Garnet GBC	94.05
Fast Violet B	505.60
Fast Blue BB	521.45

NAPHTHOL COLOURS	Per Kg
ASG	217.00
AS	143.00
ASSW	279.75
ABBS	188.15
ASBO	195.65
ASD	175.60
ASOL	179.35
ASTR	279.75
ASPH	279.75
ASE	196.05
ASEI	184.40
ASLB	1632.60
ASBT	1817.00
ASWG	143.00
ASSG	397.70
ASSR	480.60

PROCION COLOURS	Per Kg.
Golden Yellow HR	181.80
Brill. Yellow H4G	117.85
Supra Yellow H-8GP	168.55
Brill. Yellow HE6G	166.95
Yellow H-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	243.95
Yellow M GR	326.05
Brill. Yellow M 4G	177.10
Brill. Yellow M 8G	332.30
Yellow M 3R	217.60
Brill. Orange H 2R	241.85
Brill. Red H 7B	157.95
Brill. Orange M 2R	313.15
Brill. Red H 8B	169.45
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.30
Brill. Red H-F3B	243.45
Brill. Magenta HB	167.00
Brill. Red M 5B	98.90
Brill. Red M 8B	173.70
Brill. Pink MB	137.10
Brill. Magenta MB	121.55
Brill. Purple H-3R	180.20
Brill. Purple H-7R	175.40
Navy Blue H 3R	298.50
Brill. Blue H-GR	366.55
Brill. Blue H 5G	173.10
Blue H 5R	283.85
Brill. Blue H 7G	178.70
Brill. Blue H 7RX	358.15
Turquoise HA	234.45
Supra Blue H-3RP	335.70
Supra Turquoise H 2GF	181.50
Blue H-ERD	305.80
Navy Blue H ER	258.60
Blue H 5RX	269.30
Navy Blue M 3R	310.95
Brill. Blue MR	331.70
Brill. Blue M RX	214.20
Brill. Blue M-G	382.30
Blue M 4GD	344.60
Navy Blue M RB	318.75
Turquoise M-G	197.85
Brill. Blue M GX	302.50
Blue 3R Acre Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide (per kg.)	285.00
Green H 4BD	269.80
Green H-E4BI	169.80
Red Brown H 1F	143.25
Orange Brown H 28	209.05
Brown M GRN	188.80
Black H-N	283.35

SULFUR COLOURS	Per Kg.
Navy Blue	99.85
Green G	198.55
Black Grains Extra	63.05
Black Grains OG	64.55
Black GXE Conc.	61.60
Black GXE	52.75
Black GXR	61.60
Black Grains 800	54.20
Black EXR Grains	64.55
Black EXR Grains 800	51.25

VAT COLOURS (ICI)	Per Kg.
Yellow 5G Powder Fine	673.15
Yellow 5G Supra Disperse	439.30
Yellow 5G Acra Con.	628.75
Yellow 3R Powder	588.85
Gold Orange 3G Pdr. Fine	952.15
Brill. Orange 6R Pdr. Fine	624.35
Gold Orange 3G Supra Disp.	601.30
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	997.80
Brill. Red 3B Supra Disp.	713.20
Brill. Purple 4R Conc Pdr.	470.75
Brill. Purple 3R Acra Powder	690.85
Brill. Purple 2R Hly Conc.	597.90
Brill. Purple 4R Supra Disp.	500.05
Brill. Purple 2R Acra Conc.	625.95
Blue R Powder Fine	542.15
Blue BC Conc. Pdr. Fine	622.50
Blue BC Acra Conc. Pdr. Fine	762.70
Blue R Conc. Pdr. Fine	577.65
Blue RR Supra Powder	629.35
Blue Conc Powder	645.80
Brill. Blue 2R Hly Conc	378.55
Bril. Blue 2R Supra Disp.	115.65
Dark Blue 2R Powder Fine	389.25
Blue BC Supra Disp	359.40
Jade Green XBN Powder Fine	438.20
Jade Green XBN Acra Conc. Powder	823.90
Jade Green 2G Pdr. Fine	419.65
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Ptg. Paste	125.40
Olive Green B. Pdr. Fine	399.90
Olive Green B Supra Disp.	308.25
Jade Green 2G Supra Disp.	496.00
Jade Green XBN Supra Disp. (N)	327.30
Olive D. Pdr. Fine	444.30
Olive OMW Pdr. Fine	698.55
Olive OMW Supra Disp.	538.05
Olive R. Pdr. Fine	422.95
Olive R Supra Disp.	363.90
Olive D Supra Disp.	361.70
Olive D. Ptg. Paste	193.00
Olive Green B. Ptg. Paste	199.10
Olive Green B Acra Conc.	542.75
Olive R Acra Conc.	640.00
Olive Green B Acra Conc	542.75
Brown R Pdr. Fine	835.00
Brown G. Pdr. Fine	795.00
Brown R Pdr. Fine	659.75
Dark Brown 3R Pdr. Fine	685.00
Brown G. Supra Disp.	449.90
Brown 2G Supra Disp.	554.00
Brown R Supra Disp.	422.95
Brown BR Powder	719.00
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	414.55
Brown G Acra Conc.	733.95
Brown R Acra Conc	766.00
Grey M. Powder Fine	768.80
Grey M. Supra Disp.	685.45
Blue BC Acra Conc Pdr. Fine	762.70
Direct Black AC Pdr. Fine	474.70
Direct Black AC Supra Disp.	330.35
Direct Black CH Supra Disp.	393.20
Direct ACD Ptg. Paste	217.15

Delhi Market

DELHI : NOV. 6, (NNS) — Mercury looked up further by Rs. 100 at Rs. 7700 per flask in the local chemicals market during past week, followed by acute shortage of supply coupled with higher Bombay advices, says NNS. Supply rates of mercury by MMTC is Rs. 7700 per flask. Within a month mercury prices recorded a appreciable change of Rs. 1,100 per flask.

In the absence of import from France tartaric acid edged up by Rs. 100 at Rs. 6,600 per 50 kg, owing to good offtake along with higher Bombay advices. Rangolite German was stated at Rs. 75 per kg. but offtake was very less. Sufolight and Chatkolight spurted by Rs. 2.50/3 per kg. on hectic buying support from gur khandsari makers. Sodium hydrosulphite and Kalali advanced by Rs. 1 each at Rs. 34 and Rs. 36 per kg. in the face of good seasonal consumption by gur khandsari makers. Sodium sulphate Gwalior and National Rayon rose by Rs. 100 each at Rs. 3,100 and Rs. 3,300 per tonne on improvement in demand. Napthalene balls quoted higher by Rs. 10 on good demand. Camphor powder and thal eased by Rs. 1. each at Rs. 88 and Rs. 97 due to slack offtake.

Stable bleaching powder KCl and MODI firmed up by Rs. 2/4 at Rs. 94 Rs. 85 and Rs. 90 per kg. respectively owing to upward revision by Rs. 5 per kattas by manufacturers.

Menthol flake dropped by Rs. 10 at Rs. 150 and menthol bold eased slightly by Rs. 2 at Rs. 172 thanks to fresh offerings of about 3/4 tonnes from the mandis of U.P.

Titanium dioxide Anatase softened by Rs. 1 at Rs. 47 per kg. owing increased selling by stockists and distributors. Titanium dioxide RC. 822 moved down by Rs. 2 at Rs. 65. Soda ash ruled static at Rs. 272/287 on tight supply.

Dyes and colours remained unchanged and prices hovered at their previous levels and markets remained closed on November 5, 1987 in respect of Ganga Sannan and Guru Nanak Birthday.

(DELHI MARKET RATES AS ON NOVEMBER 6, 1987)

Ammonia Bicarb (per 25 kg.)	128.00
Mercury (per flask)	7,700.00
Soda ash (per bag)	272-287.00
Ammonium Chloride (per 50 kg.)	110-180.00
Caustic Soda solid (per 50 kg.)	370.00
Caustic Soda flakes (per 50 kg.)	350.00
Citric acid (per 50 kg.)	2050-2150.00
Stable Bleaching Powder Shriram (per 25 kg.)	94.00
Stable Bleaching Powder KCl (per 25 kg.)	85.00
Stable Bleaching Powder MODI (per 25 kg.)	90.00
Sod. Bicarbonate (per 50 kg.)	250.00
Sod. Hydro Sulphite (per kg.)	30.50-36.00
Rangolite (per kg.)	40.50-75.00
Boric acid Technical (per 50 kg.)	980.00
Paraffin wax (per 50 kg.)	580.00
Tartaric acid (per 50 kg)	6,600.00
Borax Granular (per 50 kg.)	520.00
Borax Crystal (per 50 kg.)	540.00
Sodium Nitrite (per 50 kg)	645.00
Sodium Nitrate (per 50 kg.)	400.00
Camphor Thal (per kg.)	97.00
Camphor Powder (per kg.)	88.00
Menthol Bold (per kg.)	174.00
Menthol flakes (per kg.)	163.00
Menthol medium (per kg.)	170.00
Glycerine (per kg.)	45-55.00
Sodium Silicate (per quintal)	300.00
Hexamine (per kg.)	26 00
Acetic Acid Glacial (per kg.)	14.50-18.00
Copper Sulphate (per quintal)	1,500-1,800.00
Formic acid (per kg.)	30.00
Formaldehyde (per kg.)	6.00
Hydrogen Peroxide (per kg.)	26.00
Calcium Carbonate (per tonne)	2,500-4,000.00
Acid Slurry Soft (per kg.)	25.00
Acid Slurry Hard (per kg.)	32.00
Phosphoric Acid (per 50 kg.)	810.00
Pot. Nitrate (per quintal)	900-1,200.00
Pot. Permanganate (per 50 kg.)	2,300.00
Sod. Bichromate (per 50 kg.)	1,025-1,125.00
Tri-sod. Phosphate (per 50 kg.)	310-330.00
Titanium Dioxide Anatase (per kg.)	47.00
Titanium RC-822 (per kg)	56.00
Zinc Oxide (per metric tonne)	28,500-32,500.00
Phenol Carbolic Acid (per kg.)	28.00
Carbon Tetrachloride (per kg.)	16.50
Chloroform (per kg.)	26.00
Sodium Sulphate (per m. tonne)	3,000-3,300.00
Naphthalene Balls (per 50 kg.)	1060.00

DYES & COLOUR	Per Kg.
Naphthol AS	150.00
Naphthol ASG	235.00
Naphthol ASBS	200.00
Naphthol ASTR	302 00
Naphthol ASOL	191.00
Naphthol ASBO	208.00

DIRECT DYES	Per Kg.
Black E. Conc.	92-150.00
Diazo Black B.T.	125.00
Green B.	115.00
Blue 2-B	86.00
Sky Blue FB	200.00
Basic Auramine 'O' Conc.	55-100.00
Basic Rhodamine B. 500%	220-300.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
Acid Orange	45-52.00

Madras Market

Prices in the Madras chemical market came in for steady trend during the week under review. However Caustic Soda items noted moderate buying enquiries and showed a slight improvement in values. Up country buying enquiries were neglected. Local market conditions continued to remain dull. The volume of transaction was selective. Business was possible in Bleaching Powder by Rs. 3 higher at Rs. 103; Caustic Soda Solid spurted to Rs. 310 against Rs. 225; Carbolic Acid and Chromic Acid Flakes maintained steady support at Rs. 18 and Rs. 26; Copper sulphate Ram further interested buying at Rs. 825; Hyflosupercell changed hands by Rs. 3 higher at Rs. 25; Sodium Silicate and Sodium Bisulphite Aswin were in moderate transaction at Rs. 130 and Rs. 185; Magnesium Sulphate Fert. and Manganese Sulphate Tech noted interest at Rs. 265 and Rs. 240.

In the Madras stock market among chemical shares E.I.D. Parry was in keen demand at Rs. 34; S.P.I.C. showed a slight recovery and went up to Rs. 30.75 and further interested buying at Rs. 31; T.A.C. were in demand at Rs. 12 against Rs. 11; Oswal Agro group came in for brisk activities. Tamil Nadu Petro maintained interest at Rs. 16.75 and Pentasia Chemicals at Rs. 33.50 respectively.

(MADRAS MARKET RATES AS ON NOVEMBER 10, 1987)

Aluminium (Ram) DCL (per tonne)	1,700.00
Acetic Acid Glacial (per kg)	15.00
Ammonium Acetate (per kg)	18.00
Ammonium Bicarbonate (per 25 kg)	138.00
Ammonium Chloride India (per quintal)	1,900.00
Ammonium Chloride Spic (per tonne)	1,700.00
Bleaching Powder (per 25 kg)	103.00
Borax Granular (per 50 kg)	1,000.00
Carbolic Acid (per kg)	18.00
Chromic Acid Flakes (per kg)	26.00
Calcium Chloride DCM (per 50 kg)	255.00
Caustic Soda (S) (per 50 kg)	310.00
Caustic Soda Flakes Andhra (per tonne)	360.00
Caustic Soda Flakes Mettur (per tonne)	368.00
Caustic Soda Flakes DCM (per tonne)	365.00
Citric Acid Deshi (per 50 kg)	3,400.00
Cobalt Oxide (per kg)	280.00
Copper Sulphate (Ram) (per 50 kg)	825.00
Cresylic Acid (per kg)	45.00
Formic Acid (per kg)	40.00
Formaldehyde (per kg)	11.00
Hydrosulphite of Soda Ind. (per kg)	35.00
Hydrosulphite of Soda Imp. (per kg)	38.00
Hydrogen Peroxide BASF (per kg)	29.00
Magnesium Carbonate Ind. (per kg)	32.00
Magnesium Chloride Pure (per kg)	28.00
Oxalic Acid (per 50 kg)	900.00
Manganese Sulphate Fert. (per 50 kg)	265.00
Manganese Sulphate Tech (per 50 kg)	240.00
Mercury (per 3.45 kg)	9,000.00
Potassium Bichromate (per kg)	19.00
Phosphoric Acid (per kg)	15.00
Stearic Acid (per kg)	18.00
Soda Ash Tata (per 75 kg)	275.00
Soda Ash Birla (per 75 kg)	365.00
Sodium Bichromate (per kg)	155.00
Sodium Bicarbonate Tata (per 50 kg)	165.00
Sodium Bicarbonate Birla (per 50 kg)	175.00
Sodium Cyanide Brigs (per kg)	900.00
Sodium Nitrate (per 50 kg)	390.00
Sodium Oxide (per kg)	1,050.00
Sodium Cyanide GDR (per kg)	50.00
Sodium Nitrite Bags (per 50 kg)	530.00
Sodium Silicate (per 50 kg)	130.00
Sodium Bisulphite Aswin (per 50 kg.)	185.00
Sodium Acetate (per kg)	19.50
Sodium Sulphate Powder (per tonne)	3,288.00
Sodium Sulphide (S) (per tonne)	5,200.00
Toluene (per kg)	25.00
Trisodium Phosphate (per 50 kg)	290.00
Urea Tech (per kg)	185.00
Zinc Oxide (per kg)	30.00
Zinc Chloride (per 50 kg)	500.00
Acetone (per kg)	29.00
Benzene (per kg)	26.00
Carbon Tetrachloride (per 100 kg)	1,500.00
Cellosolve (per kg)	50.00
Chloroform (per kg)	25.00
Diacetone Alcohol (per kg)	29.00
Dibutyl Phthalate (per kg)	33.00
Diethylene Glycol (per kg)	30.00
Sorbitol (per kg)	31.00
Dioctyl Phthalate (per kg)	32.00
Isopropyl Alcohol (per kg)	45.00
Methyl Ethyl Ketone (per kg)	48.00
Nitrobenzene Indian (per kg)	14.00
Trichloroethylene (per kg)	24.00
Triethanolamine (per kg)	42.00
Turpentine OIL (per kg)	8.00
Phenol (per kg)	29.00
Isobutanol (per kg)	22.00
Paraffin Wax (per bag)	700.00
Alkyl Benzene (per kg)	320.00
Pentaerithritol (per kg)	59.00
Glycerine (per kg)	48.00
Phthalic (per kg)	29.00
Hyflosupercell (per kg)	25.00
Copper Oxide (Ram) (per tonne)	1,500.00
Zinc Chloride Solid (per kg)	11.00
Zinc Sulphate (Ram) (per tonne)	4,500.00

MATERIALS IMPORTED

BOMBAY

(From 3-11-87 to 6-11-87)

(Cost of Imported Item is CIF Value)

AMPICILLIN TRIHYDRATE: From West Germany: IPCA Labs. Ltd., 40 kgs., Rs. 1,03,292.

BIOCHEMICALS: From USA: R. S. Durva, Indore, Rs. 2,582.

CHLOROQUIN PHOSPHATE: From China: Bombay Drug House P. Ltd., 950 Kgs., Rs. 3,21,369.

DIAGNOSTIC REAGENT: From USA: Decruz Corporation, Rs. 22,010.

DIETHYL PHOSPHATE: From: West Germany: Hoechst India Ltd., 10 Kgs., Rs. 1,000.

HYDRAZINE HCL: From Italy: Pfizer India Ltd., 100 kgs., Rs. 1,00,710.

VERAPAMIL HCL: From Italy: Torrent Labs. P. Ltd., Ahmedabad, 65 kgs., Rs. 1,42,655.

MADRAS

(From 4-9-87 to 8-9-87)

(Cost of Imported Items is CIF Value)

ACETONE: From Singapore; South India Research Instt., Hyderabad, 76,284 kgs., Rs. 6,10,666.

ALDEHYDE CB: From Netherlands: N. Ranga Rao & Sons, 150 kgs., Rs. 18,103.

ALDEHYDE C10: From Netherlands: N. Ranga Rao & Sons, 75 kgs., Rs. 12,696.

AROMATIC CHEMICALS: From Japan: N. Ranga Rao & Sons, Mysore, 540 kgs., Rs. 1,02,519.

BIO CHEMICAL REAGENTS: From USA: Vijaya Hospital, Madras, Rs. 4,091.

FRG: Keltron Component Complex Ltd., 4,840 kgs., Rs. 80,867.

METHYL NONYL ACETALDEHYDE: From Netherlands: N. Ranga Rao & Sons, 100 kgs., Rs. 15,989.

CETRENYL ACETATE: From Netherlands: N. Ranga Rao & Sons, 175 kgs., Rs. 32,093.

RIFAMPICIN: From FRG: Tamilnadu Dadha Pharmaceuticals Ltd., Madras, 250 kgs., Rs. 7,58,554.

SODIUM METHOXIDE: From UK: IEL Limited, Madras, 1 kg., Rs. 150.

ZIRCONIUM OXIDE: From FRG: BHEL, Trichy, 570 kgs., Rs. 79,750.

BOMBAY

(From 3-11-87 to 6-11-87)

(Cost of Exported Items is CIF Value)

DRUG INTERMEDIATES: To Hamburg: Paks Trade Centre, 500 Kgs., Rs. 1,69,346; To Antwerp: Sandoz (I) Ltd., 6,320 Kgs., Rs. 9,73,972.

ERYTHROMYCIN STEARATE BP: To Hamburg: M. J. Exports, 1,000 kgs., Rs. 7,77,851.

ERYTHROMYCIN STEARATE TABLET: To Hamburg: M. J. Exports, 40,00,000 kgs., Rs. 13,11,799.

ETHAMBUTOL HCL: To Hamburg: Metro Exporters P. Ltd., 500 kgs., Rs. 1,72,758.

ETHAMBUTOL HCL BP: To Copenhagen: Lupin Labs. P. Ltd., 1,500 kgs., Rs. 5,40,000.

HARMLESS MEDICINES: To Colombo: Roussel Pharml. Inds. Ltd., 88 kgs., Rs. 16,000.

HARMLESS PHARMACEUTICALS: To Hamburg: Lupin Labs. P. Ltd., 2,000 kgs., Rs. 7,17,000

NITROFURANTOIN TABLETS: To Colombo: British Pharmaceutical Labs., 263 kgs., Rs. 33,500.

SULPHAMETHOXAZOLE: To Hamburg: Metro Exporters P. Ltd., 3,000 kgs., Rs. 5,77,522.

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SG

Contact Manufacturers-
SUPARNA CHEMICALS PVT. LTD.
54, Mittal Tower, 5th Floor, 'A' Block
Nariman Point, Bombay 400 021
Tel: 22 39 24 ■ 243066

Plastic Markets Abroad

NEW APPLICATIONS TO BOOST U.S. PLASTICS GROWTH

The US market for reinforced plastics and US consumption of plastics in appliances are the subjects of two recent reports from New York-based consultant Frost & Sullivan.

The $3.5bn-a-year US reinforced plastics market could grow 25 per cent by 1990, according to a new report from Frost & Sullivan. Volume usage of these products — including nylons, polycarbonates and epoxies bound together with glass or carbon fibres — is expected to grow 5 per cent/year.

Applications range from aeroplanes, cars and boats to construction and consumer goods. Using 1985 as a base rate, the report predicts that US consumption of reinforced plastics will rise from 1.13m ton to 1.45m ton by 1990.

The study notes that the US federal aviation administration approval of three civilian aircraft is imminent, one of them a nine-passenger plane whose frame is 98 per cent epoxy-graphite and whose main wing is wrapped in an epoxy/graphite skin.

It is noted in the analysis that although aircraft/aerospace end users took up less than 3 per cent of the total reinforced plastics tonnage consumed in 1985, this figure is misleading, because the value of $420m was 29 per cent of the total used by the transportation industry. Looked at another way, aircraft uses account to more than a tenth of the market by value, because their high performance requirements have them using plastics with an average price of $28.6/kg.

The report dissects the market to provide a look at how much is taken up by a few general industry types, breaks out volume and value figures for more than a dozen categories of thermoplastics and thermosets (making volume predictions to 1990), determines the input levels of a half-dozen fibre fillers, discusses the major production processes by volume, and profiles certain suppliers.

In general, Frost & Sullivan finds that the transportation industry accounts for more than four-tenths of the market, by value, and will exceed the general growth rate to 1990

Included here are car, truck, marine, and aviation uses, thoug cars and trucks represent the vast majority of tonnage consumed. The weight of a car body and suspension system can be cut by 0.54 ton using composites the study points out'.

Machinery and equipment employing reinforced plastics form the second largest category of use, nearly three-tenths of the market value; pipes constitute the single largest application there.

Reinforced plastics have built a base about half as large in construction as they have in machinery and equipment, or 241,000

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ton in 1985, nearly all in bathroom fixtures and paneling.

Examining the filler fibres, Frost & Sullivan says it expects the high-priced carbon/graphite fibres to exhibit the best growth — around 18 per cent/year. They account for just 1 per cent of filler tonnage but almost a fifth of filler values. The more common and lower-priced glass-fibres represent 97 per cent of the tonnage but 69 per cent of value.

Broadly, polyester is the largest single plastic used; as a thermoset it accounts for 80 per cent of the total markets but only a little over half of total value.

Total US consumption of plastics in appliances was about 635,000 ton in 1986 with a value approaching $1.2bn, states another recent report by the consultant. The market is forecast to reach some 726,000 ton by 1991, with a value of $1.3bn. The consultant adds that these figures would be considerably higher except for rising US sales of appliances manufactured abroad. The value of imports rose from $1.2 bn in 1982 to $2.9bn in 1986, and now account for about 15 per cent of the US appliance market.

The report says foreign competition is a prime reason behind the push to replace metal parts in US-made appliances. A single moulded plastic component can replace many smaller pieces — requiring multiple stamping operations — in a metal component. The plastics themselves are usually more expensive than metal, but the assembly process is much less costly and is suited to automated production.

Thus, says Frost & Sullivan, plastic appliances can be priced more competitively, in addition to being lighter and more resistant to corrosion than metal appliances.

The $20bn US plastics industry (value of 1986 shipments) has resumed its upward climb in recent years, growing at a yearly rate of 6.8 per cent and more. Much of this growth has been in specialized products, including the blending or alloying of established polymers to make new plastics with novel properties.

The report examines the full range of plastics used in appliances — from polystyrene, polyvinyl chloride, polyethylene, polypropylene and polyesters to speciality plastics such as polycarbonates, with their high impact strength.

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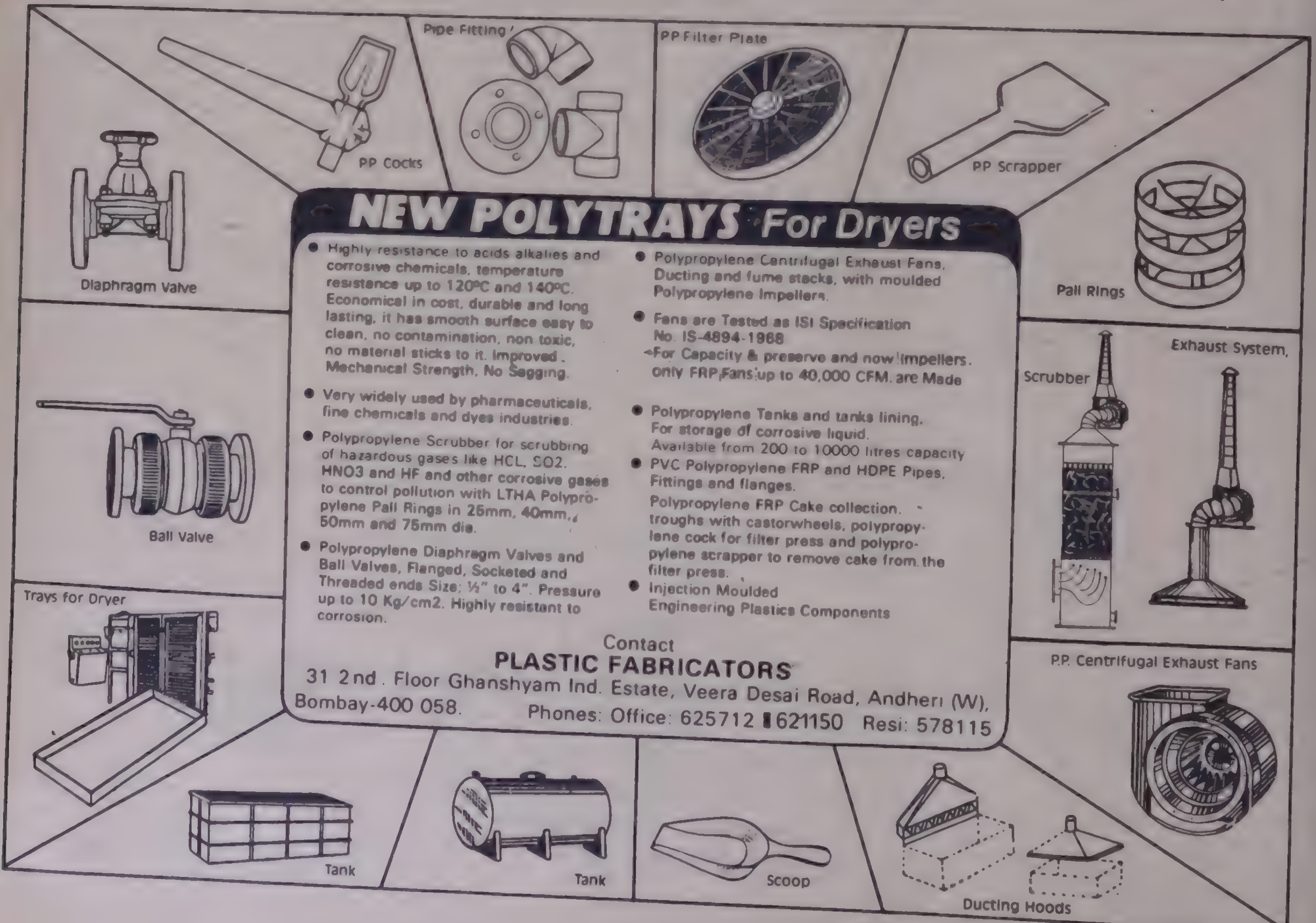

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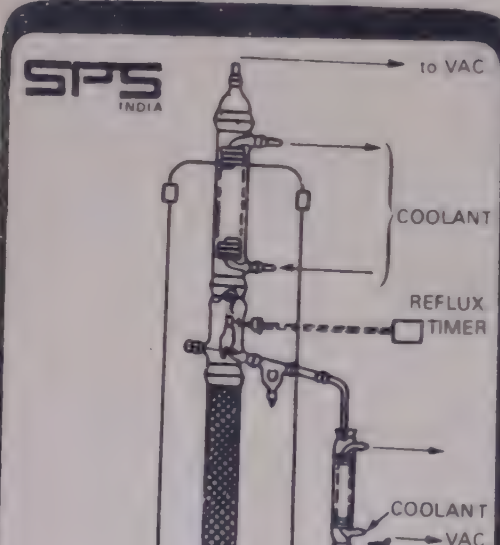

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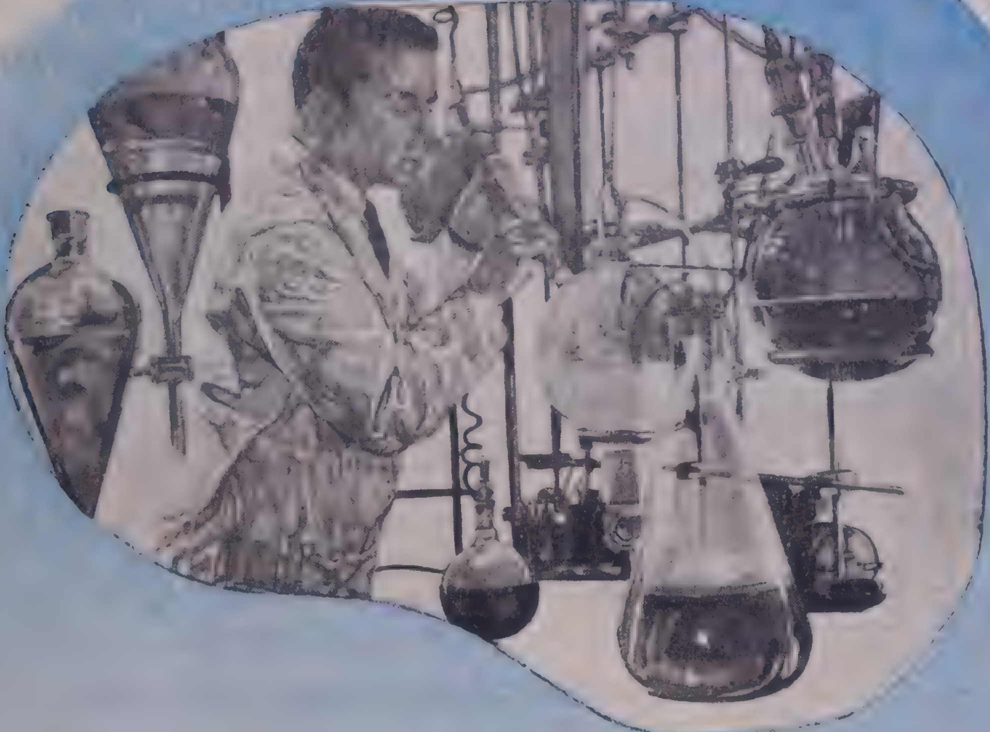

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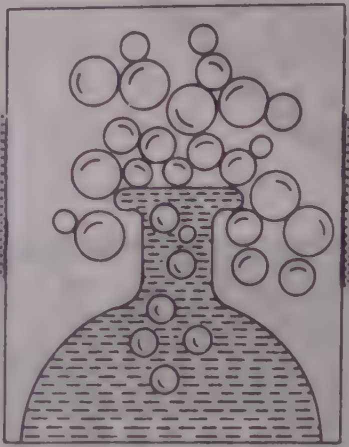

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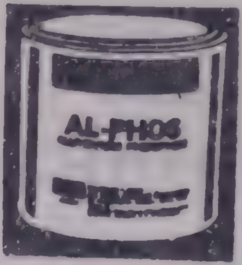

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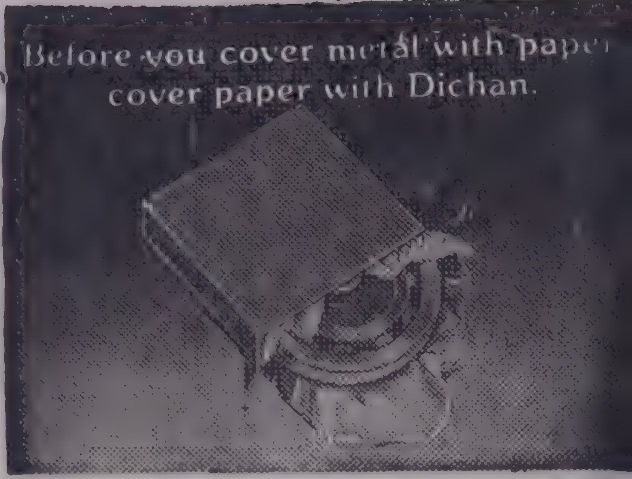

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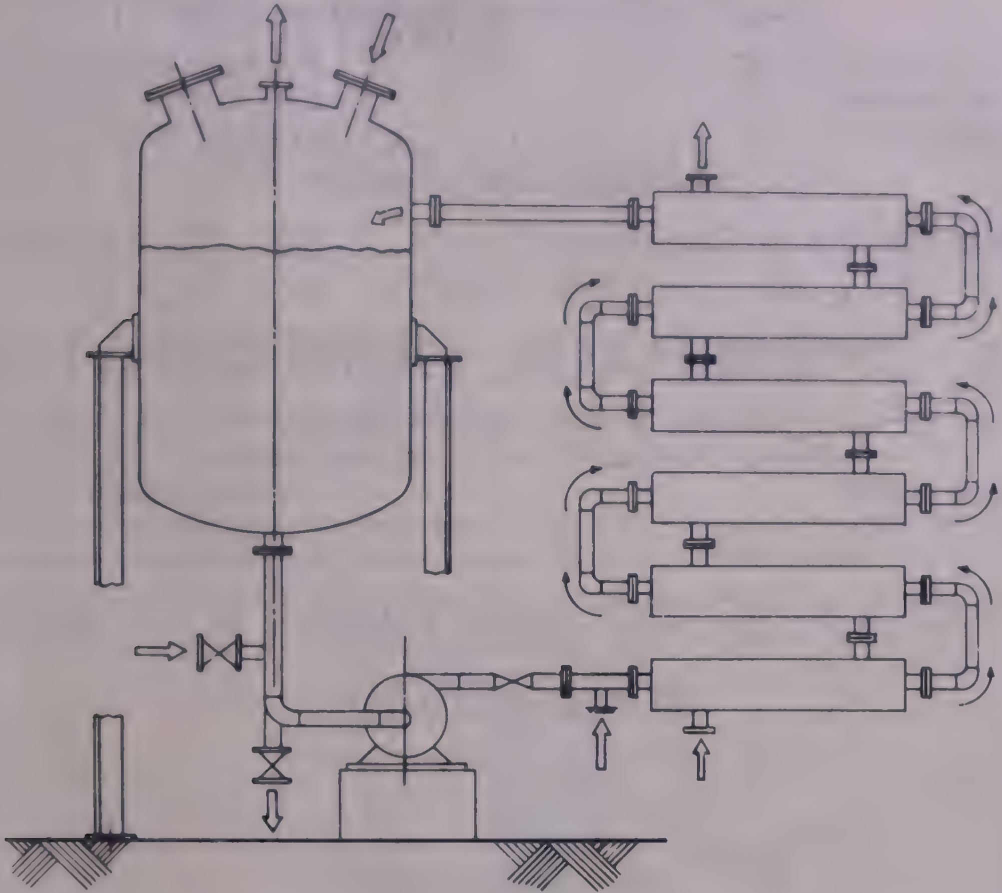

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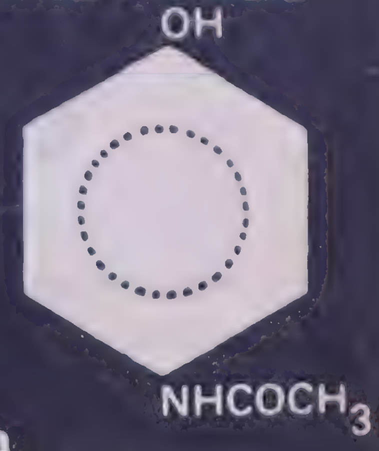

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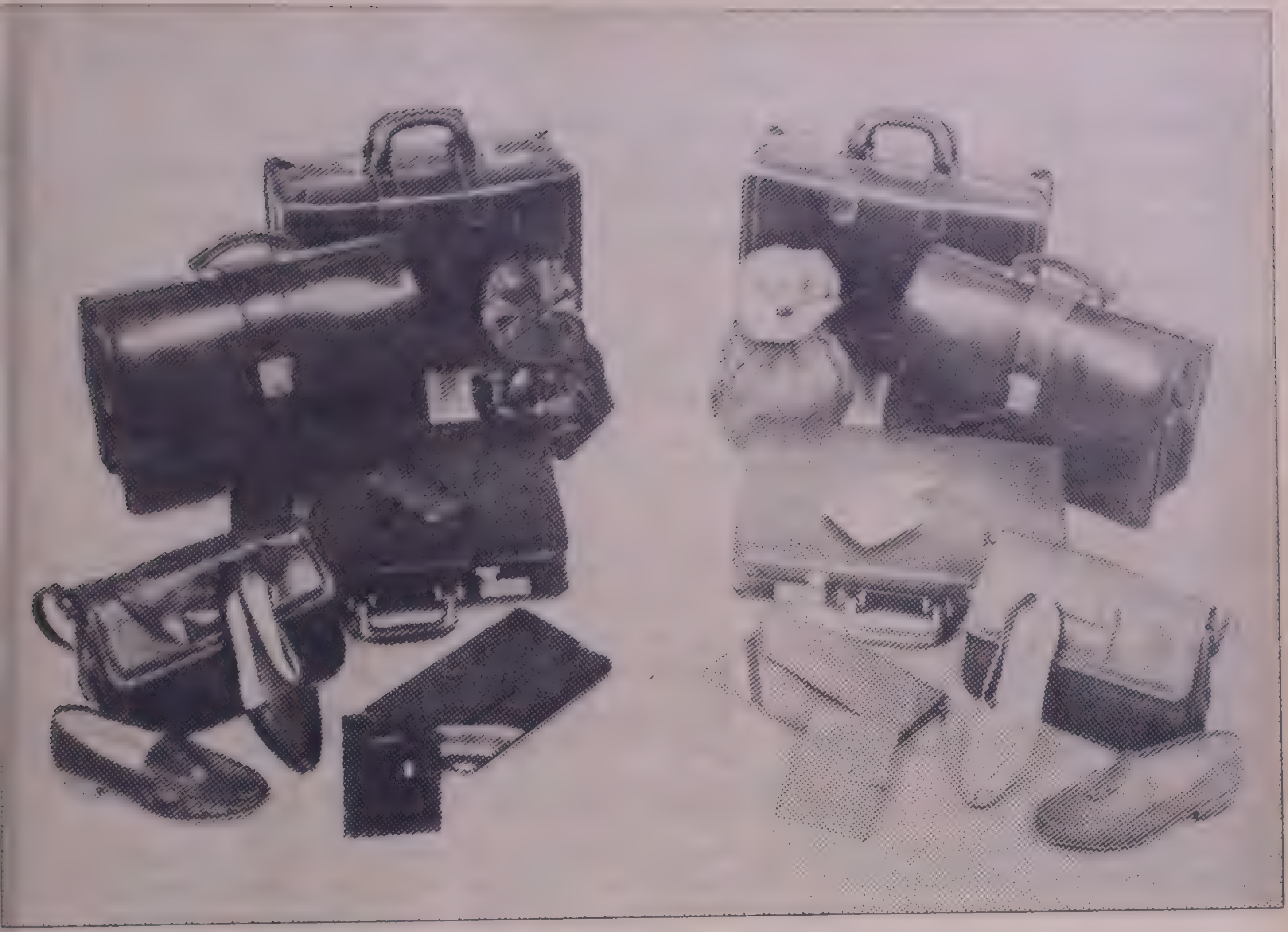

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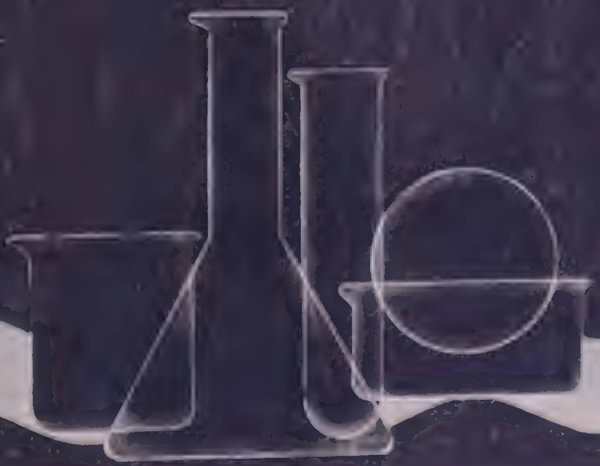

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Chemical Industry Strives for Improved Stafety Standard

It is an incontrovertible fact that many chemical products, which are of great value to the community and which play an important part in our economy are also potentially hazardous or otherwise involve production of hazardous intermediates.

In dealing with these hazards, it is sometimes possible to achieve an ideal solution by finding new process routes which permit very substantial reduction of inventory, less severe operating conditions or the avoidance of hazardous intermediate stages. However, in many cases such solutions are either not available or carry severe economic constraints. For these situations, design engineers can proceed only on the assumption that hazard potential cannot be avoided and therefore must adopt the policy of building a very high degree of integrity into the plant design. The success of this strategy depends crucially on the ability to demonstrate that the degree of integrity of the plant is adequate in relation to the scale of damage that might be caused by the potential hazard.

The last decade has witnessed commendable growth in the application of formal analytical techniques to hazard analysis and loss prevention in the chemical and petroleum industries. The techniques comprising hazard analysis can be briefly summarised as under:

Hazard survey or hazard inventory identifies all stocks of hazardous materials or energy sources with relevant details of conditions of storage, applicable at the design, erection and operation stages.

The hazard operational study identifies failure modes that could occur in a complex system and might have undesirable consequences. These give pointers to the design engineer for suggesting probable design improvements.

System reliability techniques are used for estimating the frequency of failure of a system involving many components. This includes what is termed as fault free analysis detailing probable dominant causes of failure.

Risk assessment involves quantification of the total risk (to life, property, or production) associated with a hazardous process. This procedure is used to assess comparative risk where alternative designs exist and also for assessment of acceptability of a risk and to suggest risk reduction strategies.

Safety audit normally refers to a scrutiny of the plant hardware and operating procedures after they have been in operation for specified periods.

In planning hazard analysis, the guiding principle is to carry out each analysis at a stage in the project when it would still be possible to incorporate the changes in the system. This mostly concerns the risk to the public, which if properly assessed could be taken into consideration, before the finalisation of siting and layout of the plant.

Hazard and Operability Studies (HaZoP) and Failure Modes and Effects Analysis (FEMA) are techniques coming in for steadily increasing acceptance for new projects. But their limitations cannot be overlooked since they do not provide a technique for discriminating between alternate options for improvement, which, of necessity has to be left to the collective judgement of the project team.

Reliability analysis techniques are also subject to some limiations. The statistical basis of equipment failure rates for process industries is poor, due to a large variety of plants and processes and to the variation in the properties of the products processed. However it is consoling to learn that actual experience of carrying out reliability and risk analysis studies for process industries are helping analysts to come to more positive conclusions. Risk analysis has come in for greater recognition in recent years mainly because of the need to continue operating existing process plants with large hazard potential in the vicinity of populated areas. It has come to be recognised as not only being useful for appraising planning issues relating to chemical industry but also in assisting the design process itself.

The Roper Organisation, a national polling organisation in the United States conducted a poll on a series of environmental issues. In the poll results they found that nine out of ten of the people questioned were greatly concerned about the disposal of hazardous waste in the environment. Over two third of the people responded positively to a question whether they thought there would be a major domestic chemical plant accident in the United States, in the next few decades; the majority of the people questioned, even vast majority of the people felt there would be one or more, particularly in the area of chemicals and toxics; this concern on the part of the public reflected through the poll has increase dramatically during the last five years.

What is more important is that there are certain segments of opinion who rate the risks of a chemical based catastrophe higher than from nuclear power. This is understandable because the Nuclear Energy Regulatory Commission has not only evolved detailed engineering response procedures but has made the biggest effort to educate the public at large of their integrated proposals for accident prevention and the public response procedures to face such eventuality.

Even though the chemical industry has been a late starter, there is now a massive and concerted effort towards information sharing process which will form the core of the governments responsibility in the area of accident prevention. The basic objective is to ensure that the public knows that a hazard exists in their community. Internationally there is today a major effort to create conditions for the public to work through local levels of Government and the industry concerned so that in the event of any unforeseen acident, there is clear accountability as also a ready infrastructure for combating the situation i.e. response capability. In the United States, where this awareness is at a peak, the accident prevention programme has taken the shape of information sharing and response planning projects.

There is today in the United States and some European countries a progressive climate engendered by the combined efforts of the industry, Government and th enlightened public by which a close look is being ha at the motivating factors for accident prevention an identification of the factors which are outside the scop of the three agencies. The major elements of the nationa safety programmes evolved compose of Governmen regulatory action, enforcement action, provision of info mation to the public as well as the ability to suppo response capability and preparedness planning.

New concepts are emerging in the area of change in design criteria to prevent accidents as well as location requirements imposed by Government. In India while there are no signs of any planned effort at infor mation sharing with the public and creation of infrastructure for planned response, there is heavy and unfa emphasis on the role of the industry in avoiding or eliminating major accidents involving the public at large outside the factory area.

So far as the chemical industry is concerned, ther is widespread recognition that the production, transportation, use and disposal of chemicals have inherent risk built into it. But one becomes unpopular and is often disblieved, if one states candidly, that the public fears exceed substantially the actual risks involved.

Without being labelled as an apologist for the industry or the Government, one may state that the challeng before the discerning Government, industry or public agencies is to ensure that the public safety is fully protected under all possible foreseeable conditions without jeopardising the economic viability of the industr or endangering its very survival.

This can be achieved only by balancing risks an costs and educating the public regarding the realities o the situation. The real need of the hour in any developing country today is the evolution of an industry, government programme and a public response effort to fac any eventuality. In fact, a major effort is called for so tha three agencies, Government, industry and public mov together so that national economic progress in the fiel of chemical industry is not slackened because of imag inary fears of an unlikely risk. The need for the creatio of such a conducive climate has never been more keenl felt that at the present moment when the Governmen is moving ahead with the implementation of various i considered draconian measures followed by hasty jud cial interpretations by the highest legal authority in India presumed to be based on considerations of social justice which actually threaten the very survival of th industry.

-- T.P.S. RAJA

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Methanol as Fuel

Prof. Donald F. Othmer, the doyen of Chemical Engineering and celebrated Co-Editor of the Encyclopedia of Chemical Technology has been an ardent advocate of methanol as a fuel for automobiles. He had talked on this subject a few years ago in India in his Shriram Institute Lecture before ICMA. His most recent exposition comes as a Plenary Lecture at an International Congress in Prague on August 31st (reproduced in *CHEMICAL WEEKLY* of 27.10.87). There have been setbacks in the search for alternate fuels in the last few years due to the fall in crude oil prices but the pendulum is swinging back and on its course of higher oil prices and reduced supplies. As Prof. Othmer says oil at $3 per barrel means no competition but at $25 means methanol from coal is competitive -- from natural gas even more so in the gas-rich areas. The oil price was forecast to touch $60 a barrel in early Nineties but the situation changed and this price level may not be until AD 2000.

Prof. Othmer's thesis is low cost way to methanol from high sulfur coal which does not find a ready market due to environmental regulations. The new technology -Wentworth Process -- for methanol is best suited for such coal to be converted to methanol at 50 cents a gallon ($150/tonne). The Wentworth Process uses three different catalysts in series and a 2500 ton/year plant is in operation. The catalyst beds operate at increasing temperatures with the heat generated from the reaction and finally the heat is recovered as high temperature/pressure steam for energy. Power generated therefrom goes partly for an oxygen plant to supply the syngas section. Methanol in the gas stream after final reaction is 14 mol.% -- 3 times as high as earlier processes and the gas recycle ratio is very small. Product is 97% methanol with 2% higher alcohols and 1% water and can be used directly in cars. Synthesis gas section is also very efficient with recovery of 65-70% of the heat content of the gas-feed. About a ton of oxygen per minute is used for a 1000 TPD methanol plant. The adjustments and purification system delivers a gas of desired H_2 to CO_2 ratio. H_2S is processed to recover 10 tonnes of sulfur for every 1% of sulfur in the coal used for 1000 TPD plant.

There are also other parallel developments in technology for methanol. A new approach for absorbent beds to adsorb methanol as formed and shift the equilibrium towards more complete conversion and avoid gas recycle is being evaluated. The main concern is to reduce energy needs at no significant rise in investments. Lurgi of West Germany who are also a leader in this field have developed "Combined Reforming" process and a plant of 1200 TPD has been in operation. A 2000 TPD plant has been built in Malaysia. This system uses a combination of steam reforming and auto-thermal reaction and the overall natural gas needed has been brought down by 8% to 29.5% gJ/t. The technology also claims lower investment so that at a level of 1500 TPD the cost of production is competitive with that from older less efficient plants which have been depreciated. Integration of steam energy system is very important to ensure larger energy recoveries in the form of methanol. The original low pressure system of ICI has been modified to an operating pressure of 70 to 100 bar and better cooling arrangements have reduced reactor size by having higher space-time yield with more active copper-based catalysts. Lower reaction temperatures are likely in the next few years and further reduction in capital costs. Chem Systems are developing a copper powder slurry in hydrocarbons for better yields and lower capital costs. For the present, the Wentworth system is apparently the best for coal-based methanol. For the process based on natural gas some useful data:

AT DM 10/gJ for gas
1000 t/day capacity -- Rawmaterials costs to total costs is 50%
2000 t/day capacity -- Ratio is 62%

AT DM 5/gJ for gas
1000 t/day -- Ratio is 67%
2000 t/day -- Ratio is 55%

On the Lurgi combined reforming/energy optimisation the ratio of raw material cost to the total is even lower.

Prof. Othmer has discussed the enormous and extensive trials which Bank of America have carried out on the use of methanol a fuel in their fleets of hundreds of miles. The program has shown methanol to be cheaper in miles per dollar, more efficient increases in the life of the engine, greatly decreases exhaust pollution, increaes H/P and driveability of most cars. In 10% blend with only 95% of the thermal energy of gasoline it gave the same average mileage as gasoline. It can be used as neat fuel in modified engines of lower cost. Better thermodynamic factors counterbalance the lower calorific value, and on average 1-3 gallons of methanol gave the mileage of 1 gallon of gasoline. Admixture of higher alcohols and particularly of butanols served as cosolvent to prevent separation in the presence of extraneous water. 10% blend gives adequate octane exhancement to replace TEL. The oil industry and auto industry (until recently) have not bothered on R & D on alternatives to gasoline and even the replacements for TEL are being evaluated in terms of aromatics addition and more severe cracking. "Contrary to the refusal of the oil industry to mention methanol as a synfuel, it is the most efficient and economic autofuel and can be of natural gas, any petroleum distillate or residue or ar solid fuel from peat through coal".

Lurgi have, besides the newer technology of combined reforming, a modified synthesis to yield a mixtur of methanol with a proportion of higher alcohols whic serve as solubilisers -- Octamix process. If 6% of thi octamix is to be blended with gasoline in all of Nort America and Europe there will be need for an additiona 15 million tonnes of capacity -- 100% increase. In Indi we are happy with the availability of large volumes c natural gas and after approving methanol capacity to us some of the gas we are worrying on how to use th methanol. Capacities of 200 TPD are thought of as opt mal but the concept of plants of much larger size to cate to a large fuel demand as against chemical deman needs to be examined immediately. We should not wa for the oil prices to go beyond 25% a barrel or for ou import bill on oil to touch a five figures in crores c rupees.

Settlement with Union Carbide?

There have been reports on the prospects of an out-of-court settlement of the Government claims on Union Carbide Corporation of U.S.A. Against the havoc wrought on hundreds of victims by the Methyl Isocyanate (MIC) which escaped from the Bhopal plant of Union Carbide India Ltd., this was expected after the several adjournments of the case in the Bhopal Special Court during the last year and a half for the negotiations of an out-of-court settlement. A figure of between $500 to $600 million is being mentioned. In this context the observations in these columns on May 14, 1985 are worth recalling and are reproduced below:

"The major issue now is of compensation to the survivors of the dead (number unknown) and the thousands suffering varying degrees of damage. Identification of these victims has posed problems. Specialist US laywers descended on Bhopal to sign up on behalf of victims. Although these laywers are decried as "ambulance chasers" in USA where, their fat fees are contingent on winning the damage suits and retaining a big percentage of the awards. But it must not be forgotten that these laywers perform a vital function in ensuring just compensation of victims and the US law enables them to act for their clients on a contingency basis. The essential question is whether the parent US Corporation can be sued in USA for the consequences of an accident in their company in India. Apparently this is likely to be so considering that the Government of India has finally sued Union Carbide in USA. This and many other plaints are to be jointly heard by the judge in a New York court. The proceedings are likely to be long with all the tricks and expertise of the legal profession coming into play. Damages awarded on individual cases duly proved to be the undisputed victims of the accident can benefit the parties concerned. This is not a solution to the Bhopa case where hundreds fell dead. The proof of links wit MIC or even their identities of many cannot be established. The damage suffered by survivors are als equally difficult to quantify or be indisputably attribute to the accident. An out of court settlement of sufficien magnitude is perhaps the right way although a repor said that an amount suggested by UCC was considered too small. The relief and compensation is urgentl needed and cannot be subjected to the vagaries and delays of court proceedings and appeals dragging or for years. One would hope that a degree of magnanimity will be displayed by UCC and the chemical industry and authorities in USA will exercise their influence and persuation on parties concerned to arriving at a quick settlement."

It is a pity that it took so long for Government to adopt a practical approach in this question. The US court ruled that trials should be in India but agreed that the US Corporation was as much in the dock and responsibility could not be left to the Indian subsidiary alone. Quite unnecessary expenses in foreign exchange have been incurred and nearly two years of protracted agony and uncertainty. In one way the court case has been helpful as the long list of individuals and heirs of survivors and the extent of their afflictions had to be documented. The agency of the Government of India on behalf of the affected individuals has been established in law. It is to be hoped that the settlement would soon be concluded and provide the means for rehabilitation and reimbursement of expenses by Government on some of the victims. There is talk of legal liability of Union Carbide not being established by the out of court settlement but we should not worry over this.

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HOC to manufacture polyurethanes

The State-owned Hindustan Organic Chemicals (HOC) proposes to set up a Rs. 80-crore project for manufacture of MDI and polyurethane, two-widely used chemicals in various sectors of the company.

In addition to this project, HOC also plans to raise its exports to Rs 28 crores in 1988-89 from a low of Rs. 6.5 crores in the current financial year. Exports of phenol from its new plant in Cochin would contribute as much as Rs. 18 crores to total exports in the next financial year.

Giving this information at a news conference in New Delhi the Chairman and Managing Director of HOC, Mr. H. Krishnamurthy, said the project report for the MDI and polyurethane plants was now with the government. The proposed location of the project would be Rasayani near Bombay which was also the location of HOC's present complex.

Mr. Krishnamurthy said the hunt for technology for manufacture of these two chemicals was currently on in the form of negotiations with all the five international companies, which had this technology. These were ICI of the UK, BASF and Bayer of West Germany, Mitsui-Toatsu of Japan and Upjohn of the US.

At present, only a limited quantity of polyurethane was produced in the country. MDI, which was used as a raw material for manufacture of polyurethane, was imported. If and when HOC starts manufacturing polyurethane, used as insulators and in automotive bodies the country would be able to conserve some scarce foreign exchange through import substitution.

HOC's export plans were backed by its decision to introduce marginal costing for pricing its products. In other words, the fixed cost of manufacture would be covered by HOC's domestic sales, while export prices would be based only on the variable cost.

Mr. Krishnamurthy said besides planning to export 12,000 tonnes of the total production of 32,000 tonnes of phenol in 1988-89, HOC would also export 12,000 tonnes of acetone and some quantities of meta-aminophenol, orthonitrochlorobenzene, sulphonic acid and di-amino diphenylsulphone. In 1986-87, HOC exported chemicals worth Rs. 4.56 crores against Rs. 2.45 crores in the previous year.

Mr. Krishnamurthy also recounted the recent developments pertaining to its growth and diversification. The public sector had just completed the setting up of a plant at Cochin at a cost of Rs. 87 crores to produce 40,000 tonnes of phenol and another plant to produce 24,000 tonnes of acetone per annum. Phenol was a broad-based chemical and India imported over 15,000 tonnes of phenol per annum.

At Rasayani near Bombay, HOC's total investment came to about Rs. 80 crores. Its total turnover in 1987- 88 was expected to touch a level of Rs. 130 crores. HOC had also set up a subsidiary company, Hindustan Flurocarbons Ltd in Hyderabad to produce 500 tonnes of polytetrafluroethylene (PTFE), a high-technology engineering plastic item, Mr. Krishnamurthy added.

UPGRADE QUALITY, PLASTICS UNITS TOLD

The Finance Minister, Mr. N.D. Tiwari, has asked the plastics industry to bring down the prices of its products and to improve quality.

Inaugurating a seminar on "Indian plastics by 2000 AD" in New Delhi Mr. Tiwari said that plastics in India were 150 to 250 per cent more expensive than in the developed world. This clearly showed that adequate attention had not been paid to the productivity of the plastics industry, he said.

The Finance Minister said that since plastics were used by all sections of the society, a lowering in its prices would lead to enormous expansion in demand. On its part, the Government has sharply reduced the duties of raw materials for plastics.

It was now for the industry to further improve the efficiency by upgrading technology and increasing the scale of production, bring down the production costs and pass on the benefits to the consumer in the form of substantial reduction in prices, he said.

The Indian consumer, Mr. Tiwari, said, had till now been given indifferent quality and unattractive designs. There was need to ensure that domestic products were as attractive and well designed as the best foreign one, he said.

Improving the quality would help enhancing the credibility in the export market automatically, Mr. Tiwari observed.

The Minister further said that there was a vast potential for the demand of plastics to grow manifold. There were many high-tech industries which could adopt the new plastic products and wider scope for its use in agriculture and irrigation, consumer goods and industrial products. Plastics could also play an important role in the water resources management, he said.

Mr. Tiwari said that it was for the plastics industry to grasp the opportunity and take the country into the 21st century, abreast with the rest of the world.

KRIBHCO BID TO ENTER PETROCHEMICALS

Krishak Bharati Co-operative Ltd (KRIBHCO), a leading fertiliser manufacturer, is exploring the possibility of entering the petrochemicals field in collaboration with the Gujarat Government.

Negotiations with the Gujarat Government to set up a petrochemical complex in the State at an estimated cost of Rs. 1000 crores are in an advanced stage, the KRIBHCO Chairman, Mr. Bansi Lal Mehta said.

He said Hazira, where the cooperative's fertiliser plant was located, would be an ideal place for starting a petrochemical complex, since it has all the necessary infrastructure.

Mr. Mehta said KRIBHCO has also approached the Union Government for allotment of a gas-based ammonia-urea complex out of the approved projects in Uttar Pradesh or Rajasthan. This would utilise the proven experience gained by the co-operative in the field of fertiliser industry, he said.

Besides, KRIBHCO was working out proposals for DAP-ammonium nitrate project.

The co-operative was currently installing a unit at Hazira to recover hydrozen from purge gas, at present being used as fuel. The unit will increase ammonium production by about 106 tonnes per day. This would also result in reduced energy consumption.

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Dr. O. P. KHARBANDA

Frankly Speaking

O. P. KHARBANDA
Cost & Management Consultant,
501, Olympus, Altamount Road, Bombay-400 026.
(An author of repute and a visiting professor, Dr. Kharbanda consults worldwide including to UNIDO).

Speedy Product Development

Time is the most precious resource and the company which can reduce the development time for a new product has an immediate advantage over its competitors. Some classic examples of substantial reduction in the product development time are noteworthy :

- Allen-Bradley (an engineering component manufacturer in USA) has reduced the development cycle of electrical contactors to a mere 2 years from the earlier 7 years.
- General Motors, as also Ford, Volkswagen and other leading manufacturers are trying hard to match the Japanese industry's development time of 3 1/2 years from the earlier 5-7 years.
- IBM's successful entry in personal computers field in 1981 has been ascribed mainly to its practically halving the product development cycle of two years.
- Proctor & Gamble has reduced the development time of many of its household products to less than half.
- Rolls-Royce, the recently privatised aero-engine maker of UK has reduced the turbine blade development-to-certification cycle from over five years to two and a quarter.

Product development has been somewhat of a neglected area because of the pre-occupation of companies in the west to emulate production techniques of the Japanese. But mere survival in the fiercely competitive international market has forced the Japanese competitors to try reduce the product development cycle. Also the emphasis has shifted to product improvements which is far easier, cheaper and quicker to accomplish than to develop a new product. Two additional trends, also pioneered by the Japanese, are noticed :

- Splintering mass markets into segments and directing a specific product at each segment.
- Shortening the market life of a product.

These two factors put a further pressure on quick development of new products. The earlier a product is on the market, the better are the chances for its success, and in addition the development cost is lower too. In particular, short development period can be crucial for consumer electronics for which even a six months delay in its introduction can reduce its life-cycle profits by a third. Reducing development period, even with a cost overrun, can pay rich dividends. Early and timely introduction of a product is more important than the development costs.

In some cases, however, a late start can be beneficial in not only reducing the development cost but also in reducing the risk, having learnt from the experience of a competitor. A classic example of this is the $1.5 billion development of Boeing's 767 which was slowed deliberately and kept at 'concept phase' stage for quite some time but then rushed through to beat A310 Airbus to the market by eight months. This gave Boeing a headstart with perhaps 100 odd aircrafts sold in the first year.

The academic as well as the industrial world are amazed at the sudden coming to life of the dying mammoth, Xerox Corporation, and beginning to give its Japanese competitors a fight for their life. In the past five years Xerox has been able to cut the important parameters to half. Development and launch of new products has been reduced from six or more years to nearly three. Even the production costs have been cut by fifty percent. With practically halving the price of some of its new copiers, it has regained some of the lost market share, and making a profit, too !

(Source : Christopher Lorenz : Fin T, June 17 1987)

PESTICIDES UNITS :

Need to adopt latest technology stressed

The secretary, department of chemicals and petrochemicals, Mr. H. K. Khan said on 13th November that there was need for updating the pesticides ndustry through adoption of the latest echnology.

Mr. Khan was delivering the valeditory address at the conclusion of the ve-week regional training programme n quality control of pesticide formulations organised by Hindustan Insecticides Limited (HIL) and the regional network for production, control nd marketing of pesticides in Asia nd the Pacific (RENPAP).

He said that the training programme was primarily designed to reinforce the pesticides formulation industry in order to attain self-sufficiency in food production through judicious use of hese vital inputs. The programme is he first major one since India assumed the role of coordinator of RENPAP in June 1987.

He welcomed the active association of China which had lately joined the programme besides Republic of Korea, India, Indonesia, Thailand and Sri Lanka.

Mr. Khan pointed out that the programme had brought together the World Bank, FAO and UNDP, for executing the pesticides evaluation and safety testing programme (PEST) of the World Bank.

The chairman and managing director of HIL, Dr. S. P. Dhua said that the programme attempted to cover environmental aspects vis-a-vis quality control meaeures required by producing units.

It was agreed at the end of the programme that the safety guidelines for undertaking analysis and operating procedure for the analysis should be prepared in collaboration with FAO/-GIFAP. It was also agreed that the necessary strategy should be worked out in cooperation with CIFAP for proper disposal or reprocessing of outdated pesticides.

COAL INDIA LOSS

Coal India Ltd. and its subsidiaries suffered a loss of Rs. 404.18 crores during 1985-86, Mr. Sathe said.

The main reasons for the heavy losses were increase in the wage bill resulting from liberalised payment of gratuity and ex-gratia payment in lieu of bonus, increase in consumer price index, other cost escalations, non-revision of coal prices for greater part of the year and higher proportion of inferior grades of coal in the total production, he said. The accounts for the year 1986-87 were yet to be finalised.

The Minister said Coal India is taking steps to improve its financial performance by better utilisation of manpower, machinery and introduction of better management practices and technology.

EEC TO SUPPLY 3 LAKH T. POTASH

The European Economic Community will supply 3 lakh tonnes of potash fertiliser to India as grant upto December.

According to an EEC release in New Delhi on November 13, the purchase of another 1.50 lakh tonnes of potash is underway.

The supply conforms to the framework of 1986 financial and technical aid programme. Under it the Community would provide financial assistance upto 45 million ECU for fertliser (one ECU equals $ 1.289).

The imports will be contracted by the Minerals and Metals Trading Corporation (MMTC), the canalising agency for the import of fertiliser.

4 NEW PROPOSALS BY IOC

Indian Oil Corporation (IOC) has submitted proposals for new projects with an estimated cost of Rs. 889.62 crores, minister of state for petroleum Mr. Brahm Dutt told Mr. K. Ramamurthy in the Lok Sabha during question-hour.

The proposals are : Kandlabhatinda product 603.88, second SBM at Salaya 83.27, modernisation of Digboi refinery 168.34, and separation of propylene at Mathura refinery 25.13. 880.62.

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LICENSING :

Exemption for units with firm export order

The Centre has further liberalised its licensing policy by exempting industrial undertakings from the requirement of obtaining a licence for fulfilling one-time export orders. This exemption will, however, be granted only to those units which have a firm export order on hand.

A notification to this effect has already been issued by the Department of Industrial Development in the Industry Ministry.

Such industrial undertakings which have a firm export order on hand can write to their administrative ministries concerned for permission to undertake production of the items for which the orders have been obtained. The administrative ministries will satisfy themselves that the unit holds a firm order for export and then permit it to take up the manufacture of the item without obtaining a licence.

The ministries, however, have to ensure that the manufacture of such items is a one-time operation and the entire production covered by the permission has to be exported. In all such cases, it is not necessary for the industrial undertakings or the administrative ministries to approach the Secretariat for Industrial Approvals (SIA) for issuing the permission letters.

If an industrial undertaking wants to produce the item on a regular basis for exports, it should apply for an industrial licence in the normal course, the notification states.

Companies functioning under the Monopolies and Restrictive Trade Practices Act and Foreign Exchange Regulation Act and wishing to avail this facility will have to write to the joint secretary concerned in their administrative ministries, which have been authorised to receive such proposals and accord permission without having to place the matter before any approval committee.

Industrial undertakings covered under the MRTP Act will have to submit a memorandum to the Department of Company Affairs for the purpose of record. This would contain the details of their proposal in fulfilment of the conditions mentioned in the department's earlier notification.

This decision of the Government is aimed at helping industrial undertakings respond quickly to export orders. It will be recalled that earlier the Government exempted licensed undertakings from the requirement of obtaining a licence for achieving production in excess of the licensed capacity, provided the entire excess production is meant for exports.

TECHNOLOGY IMPORT : TDF LIMIT RAISED

The government has decided to relax the existing limit of Rs. one crore under the technical development fund scheme for import of technology and capital goods.

The relaxation will be up to an additional Rs 25 lakhs for peripheral items to be imported in the technology upgradation package.

According to an official press release, composite proposals received from industrial units will now be eligible for consideration under the TDF scheme if payments for the "basic items" of the technology package such as capital goods imports, knowhow fees and royalty, drawings and designs are within the ceiling of Rs. one crore at the prevailing rate of exchange.

The proposals will be eligible for consideration even if by virtue of some other "peripheral items" in the package the total requirement of foreign exchange exceeds Rs one crore. Such peripheral items could include training of indian personnel abroad, erection, commissioning and supervisory charges, other technical services to be rendered by the technology supplier and the like. The excess over Rs one crore should, however, not be more than Rs 25 lakhs.

The excess thus allowed will be adjustable against the entitlement of the applicant unit in the following year. In case the party applies again under the TDF scheme this relaxation will also be subject to the assessment that the package of proposals contained in the application should be an integral whole. In other words, it would not be technically prudent to delete any of the items proposed for import without impairing the technology upgradation and modernisation programme.

PLANT AND MACHINERY : DEPRECIATION ALLOWANCE RATE HIKED

The government announced depreciation allowance at a higher rate of 50 per cent for capital equipment plant and machinery installed to manufacture goods based on indigenous technology. The depreciation allowance will be available for the machinery and plant installed in the accounting years relating to the assessment year.

According to an official release, for availing this incentive, articles should be manufactured by using technology or "Know-how developed in the laboratory owned or financed by the government, public sector company, university or an institution recognised for this purpose by the prescribed authority. This incentive will also be available to such cases where the right to use the technology process or know-how to manufacture or produce the items has been acquired by the tax payers from the owner of such laboratory or any other person deriving title from such owner. The incentive has been given to encourage indigenous technology.

The increased depreciation allowance of 50 per cent will, however, not be admissible for items mentioned in the eleventh schedule referred in rule 5(2) of the Income Tax rules. For claiming additional incentive the tax payer will have to furnish a certificate from secretary, dept. of scientific and industrial research alongwith the return on income. The certificate is intended only for the plant and machinery installed after April 1, 1987 and will be subject to the provisions of section 32(I)(II) of the Income Tax Act.

LUBRICATING OIL PROCESSORS TO OBTAIN LICENCE

All existing processors of lubricating oils and greases have been asked to obtain a licence by March 31, 1988, under the Lubricating Oils and Greases (processing, supply and distribution regulation) Order 1987, of the ministry of Petroleum and Natural Gas. Earlier, they were expected to obtain the licence by September 30, 1987.

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NEWS IN BRIEF

NATURAL GAS SAVES FOREIGN EXCHANGE

India has been able to save substantial foreign exchange by using natural gas in various sectors of the economy, although its vast potential has been exploited only partially. But for the substitution of crude derivatives by natural gas, the total import bill of crude would have been significantly higher.

The country spent as much as Rs. 2,216 crores in foreign exchange for the import of crude in 1986-87. The substitution by natural gas produced within the country brought about a foreign exchange saving of nearly Rs. 1,025 crores, about half as much as the total outflow of foreign exchange.

With the new thrust now being given to production and utilisation of natural gas, the total foreign exchange saving during 1990-91 will be of the order of Rs. 2,000 crores, according to official sources.

The development of gas resources and the prospect of substitution for oil has thus become a priority issue with energy planners. Excessive dependence on oil and the high growth rate of oil consumption, put at between six and seven per cent, has necessarily called for a shift to other resources, and natural gas is emerging as an 'attractive and viable substitute for oil.

Fortuitously, significant discoveries of natural gas have been made in the country. Reserves have increased five-fold during the last decade, and are expected to increase further.

As on January 1 this year, total gas reserves were of the order of 1,005 billion cubic metres, which is expected to go up to 1,231 billion cubic metres by the end of the Seventh Plan.

$ 650-M. DEAL WITH CARBIDE LIKELY

Union Carbide and India, negotiating compensation in the Bhopal gas leak case, are nearing an out-of-court settlement of $600 to $650 million spread out over seven to ten years, the "Washington Post" said.

Serious negotiations on an out-of-court settlement under way since summer are believed to be closing in on a figure no lower than $500 million which is well above Carbide's last offer of $350 million, though less than the $1 billion which the Indian government sought earlier.

The Indian government, not deeming it appropriate to enter a trial which could extend over a decade, may enter into one of the largest out of court settlements in history, the report said.

The "Post" quoted a Congress party confidant of the Prime Minister, Mr. Rajiv Gandhi, as saying that "the two sides are very close (to a settlement). Everyone agrees on the need for a settlement and they are not too far apart on the amount. It now seems to be a question of the terms for the payments, how much over how long a time."

The case comes up for hearing in the special district court of the judge, Mr. M.W. Deo, in Bhopal on November 11.

Union Carbide wants a settlement, but on the condition that all charges be dropped. An official for Carbide in Danbury, Connecticut, was quoted as saying: "To pursue the litigation road would take five, ten, 15 years." This would not help the victims and the lengthy process of trial is not the preference of Carbide."

NEW POLICY ON INDUSTRIAL ALCOHOL BY EARLY NEXT YEAR

The recently announced government policy on molasses attempts to reconcile the interests of the sugar manufacturers, distillers and industrial users. Continuous dialogue between the Central government and the states are on to rationalise state levies on alcohol.

Inaugurating a seminar on the alcohol industry in India organised by the department of business economics, University of Delhi and sponsored by the All-India Distillers' Association (AIDA), Mr. H. K. Khan, secretary, department of chemicals and petrochemicals observed that the new policy on the industrial use of alcohol could be expected early next yea which would emphasise on certai minimum economic plant size comparable to the prevailing internationa standards. Soft loans could be expected for pollution control equipmen and modernisation and rationalisatio of technology from the financial institutions.

USSR TO IMPORT PAINTS FROM INDIA

The Soviet foreign trade organisation "Soyuzkhime export" signed or November 14, agreements with twc Indian companies, for the import o paints and its raw materials.

The agreements, which were the first contracts signed at the India International Trade Fair '87 are worth Rs. 20 million each.

According to Mr. A. Babeshko, director of the Soviet exposition at the trade fair, negotiations are going on between Indian business firms and several Soviet foreign trade organisations for both the import and export of various products and a number of contracts are expected to be signed during the exhibition period.

He said the USSR was exhibiting this time latest equipment and products especially in the field of electronics, and machinetool engineering.

BIOMOLECULAR LAB SET UP

The Department of Atomic Energy has set up a Rs. one crore laboratory for development and production of phosphorous-32 and sulphur-35 labelled biomolecules at the campus of the Centre for Cellular and Molecular Biology (CCMB) Hyderabad under a joint project with CSIR.

Disclosing this to newsmen Dr. R. C. Deshpande, Director, Isotopes Group of Bhabha Atomic Research Centre (BARC), stated that these biomolecules were important research tools in modern biology and bio-technology, now commercially made only in the US and the UK. The short half-life of the radioisotopic label (14 days) and the heat sensitive nature (requiring storage a low temperatures) make it expensive and impractical to import them from overseas for regular use in the country, Dr. Deshpande said.

Varun polymol to make pesticides

Varun Polymol Organics Ltd., a newly floated company for the manufacturers of pesticides has offered for subcription 6,30,000 equity shares at Rs. ten each for cash at par with a reservation of 2,10,000 equity shares for non-resident Indians (NRIs).

Mr. P. D. Deshmukh, chairman and managing director of the company said that the company had been floated by technocrats of proven track record with the co-operation of International Technology Investments, Inc., USA, (ITI), an enterprise formed by highly qualified NRI's to raise venture capital for investments in India.

Mr. Deshmuk was optimistic that the turnover of the organics will be Rs. 550 lakhs, Rs. 685 lakhs and Rs. 855 lakhs in its first three years of operations despite the prevalent drought conditions and expected a gross profit before interest and depreciation of 16 per cent, profits before tax of eight per cent and profits after tax of six per cent over the turnover and expected to give dividend of 15 per cent in the first year and raising it to 25 per cent in the third year.

Mr. Deshmukh said that Varun Poly-Organics will manufacture pesticide formulations for agriculture and public health. The range will include insecticides, acaricides, herbicides, and rodenticides and plant growth regulators for agriculture in liquid, powder and granular forms, besides a household insecticide.

UB, SWEDISH BIOTECH FIRM SET UP NEW CO

Sweden's Pharmacia AB, world leader in biotechnology, and United Breweries Ltd. have announced the setting up of their joint venture — Pharmacia United Ltd.

The new company, which will have 40 per cent equity participation by Pharmacia AB would promote and launch progressive manufacture of life-saving drugs and drug delivery systems based on biotech. It would also promote basic research at the Vittal Mallya Memorial Research Centre, Bangalore, and the Indian Institute of Science.

The new company would pioneer research and development and endeavour to make available in India specialised reagents, vaccines, diagnostics facilities and advanced systems in ophthalmics.

The company, which is expected to invest around Rs. 50 crores in the next couple of years, was launched at a simple function held in Bangalore recently.

THRUST ON FINISHED LEATHER PRODUCTS EXPORT

The Indian leather industry is launching a major programme for increasing the export of finished products.

The Central Leatner Research Institute, the largest leather research laboratory in the world, has restructured its research and development programmes to meet this challenge through the most modern technologies.

According to the new programme, India will export leather and leather products worth Rs. 1,700 crores in 1990. The exports this year were worth Rs. 950 crores.

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Rubber units told to formulate growth plan

The Union Government has asked the rubber and rubber goods industry to formulate a perspective plan to ensure that the industry both in the organised and small-scale sectors grow in a balanced manner.

The perspective plan should keep in view of the technological needs and economies of scale optimum for the industry. The industry should also step up its research and development efforts in view of the complexity and variety of rubber products, so that the facilities of the Indian Rubber Manufacturers' Research Association could be effectively utilised.

Suggesting this at the inauguration of a seminar on technological achievements and advancement in Indian rubber industry, organised by the All-India Rubber Industries Association at New Delhi on 17, November. The Union Minister of State for Industry, Mr. M. Arunachalam, said the industry should also give serious consideration to the need for raising consumption of synthetic rubber so that a balance and self-sufficiency in synthetic as well as natural rubber could be achieved.

Mr. Arunachalam said it was a matter of concern that the consumption of natural and synthetic rubber by the industry was in the ratio of 70 per cent for 30 per cent, which was just the opposite of the consumption ratio in the advanced countries. This was serious as the requirement of the rubber industry's basic input increased and it had to depend increasing on imports.

The Minister said while India was among the first nine countries in terms of rubber consumption while the per capita consumption is only 0.4 kg. compared to 12kg per head in the advanced countries. The need for the industry to reach the rural masses was also stressed by the Minister.

High rate of effluent discharge into tungabhadra

Effluents spewing out of a polyfibre and a rayon factory have severely polluted the Tungabhadra river downstream of Harihar town in Karnataka, completely wiping out aquatic life in that stretch, investigations have revealed.

The river 'severely polluted' near the outfall of the two industries upto 500 metres downstream and aquatic life is "completely absent" in this stretch, the investigations conducted by the Central Inland Capture Fisheries Research Institute (CICFRI), Barrackpore, West Bengal, has disclosed.

As far as the impact of pollution on water quality was concerned, marked depletion in the dissolved oxygen at the outfalls of the two factories was noticed till Airani village, but the opposite bank of the river upto 10 km downstream was affected only marginally by the septic conditions prevailing on the factory side.

The report said collections of bottom and littoral fauna also showed species of bivalves, and six species of gastrepods in 'freshly dead condition' downstream of the discharge point.

However, the opposite bank of the river remains unaffected helping sustenance of aquatic life and in the region between 0.5 km and one km downstream, a number of patches of aquatic weeds grow on the factory side during the lean flow period between December and June.

The study noted that although the presence of mercury in water was not detectable, its significant presence in sediments around the polyfibre factory outfall and further downstream suggested occasional discharge of mercury into the river.

The polyfibre factory producing 170 tonnes rayon grade pulp every day and the rayon factory producing 800 tonnes grasiline fibre per month generate 33,000 cubic metres and 11,000 cubic metres per day of waste water respectively, discharging them into the Tungabhadra river near Harihar town at two points, 150 metres apart.

In its recommendations to minimise pollution, the report suggested that the two factories be asked to scrupulously follow the ISI/MINAS standards for disposal of their effluents into the river, which needed to be monitered periodically.

Discharge of effluents from the two factories should be stopped during the lean period into the river as a short-term measure, the report suggested.

The investigations were carried out by CICFRI scientists H.C. Joshi and K. Sukumaran on behalf of the Karnataka State Pollution Control Board.

CONCERN OVER LEATHER EXPORTS FALL

The Indian Leather Products Association (western region) has in a communication to the Union commerce minister, expressed concern at the sharp fall in the share of leather exports from the region. Exports from the western region in the last two years has declined from 15 per cent to 7 per cent of the country's leather exports.

Lt Col T. S. Malik, western region chairman of the association, has pointed out that the drop, is attributable mainly to raw material shortage, despite the region having one of the best infrastructure necessary. He has said that unless exports of finished leather is banned, it would damage the good prospects of export of value added leather products which has been identified as a thrust sector by the government.

The association has decided to from a co-operative with a view to establishing an integrated leather complex around Bombay with a common facility centre for which it has planned to approach the chief minister for a plot of land.

HOC PAYS RS. 153-LAKH DIVIDEND

The state-owned Hindustan Organic Chemicals Ltd. (HOC) has paid to the Government a record dividend of Rs. 153 lakhs for the year 1986-87. The dividend cheque was presented to the Prime Minister Mr. Rajiv Gandhi by Mr. H. Krishnamurthy, Chairman & Managing Director of the company on 17th November.

Hoc has been consistently paying dividend for the last 13 years to the Government. These was marked increase in the company's production and sales during the year resulting in 31 per cent increase in net profit.

GLEANINGS FROM THE PRESS :

The technology debate

One of the positive results of liberalisation that has been undertaken in the recent past is the recognition of the importance of technology in industrial development. Nothing is more urgent today than a public debate on matters relating to industrial policy, especially if, in doing so, a re-examination of views long held as universal truths becomes possible.

Delivering the Hussain Zaheer Memorial Lecture recently, Mr. Abid Hussain does this with considerable candour. That technological advancement is far more important than simple capital formation for growth is incontrovertible. But where should that technology come from? Mr. Hussain dismisses, and rightly so, the distinction between imported and indigenous technology, that is often made on the specious plea of "self-reliance". Forty years after adopting that slogan we are nowhere close to realising it, for the simple reason that no society can find within itself all the knowledge and instruments to fuel and sustain industrial growth. As Mr. Hussain points out, the distinction is also irrelevant since the crucial issue is the degree to which a society can adapt technology to its factor endowments. He might have added that the history of development "miracles" over the last few centuries down to the present demonstrates the importance of adapting technology to one's needs.

Mr. Hussain rightly asserts that the Indian environment has not been particularly encouraging, what with the regulatory controls that curb growth. But there is a certain ambivalence. If, as he says, "it is better to allow the market to pick technological winners and losers", then is it prudent to have, as he suggests, a government plan "for technological change at the level of a producing enterprise"? Citing the case of MITI of Japan may not be appropriate. MITI may have helped Japan's industries in international markets. But "administrative guidance" by the Japanese government has not equipped business to deal with foreign competition in the domestic economy.

The impact of Mr. Hussain's otherwise forceful views on technology and development is diluted by the insistence that the state can play a positive role in planning at "sectoral levels". The degree to which the market will function freely to assimilate technological innovation under such a dispensation is a matter of debate.

— ECONOMIC TIMES

DRUG PRICES TO INCREASE BY 10%

As a result of the new drug policy announced by the Government, prices of essential drugs would go up by "10 to 20 per cent" next month when the existing prices would be revised., the Minister of State for Chemicals, Mr. Jayachandra Singh said.

Mr. Singh said that the new drug policy would help the public sector Indian Drug and Pharmaceuticals Ltd (IDPL) "to turn the corner" and earn cash profits by 1988 end.

Meanwhile, Indian Drugs and Pharmaceuticals Ltd has withheld Rs. 21.38 lakhs due to the Bofors company of Sweden under a collaboration agreement, Mr. Jaichandra Singh said.

Under the collaboration agreement, Bofors supplied batch process plants for the Muzaffarpur unit of IDPL. But due to frequent power breakdowns the guarantee trial runs of one item, Niacinamdide, were vitiated, the Minister said.

The agreement provided for a penalty of Rs. 16.30 lakhs if the guarantee condition could not be fulfilled. However, IDPL has withheld Rs. 21.38 lakhs due to Bofors under escalation clause, the Minister said.

INDIAN SMALL SCALE CHEMICAL INDS. ASSOCIATION

The Indian Small Scale Chemical Industries Association; Bombay is now operating from 909, Raheja Centre, Nariman Point, Bombay-400 021. (Phone : 244626 243939/-28739321.

Mr. K. C. Mashruwala, President of the Association in a communication, has requested the members to get in touch with the Association for any further details and assistance. The Association, right from its inception, has been rendering yeoman services to the chemicals and allied industries, particularly to the small scale manufacturers.

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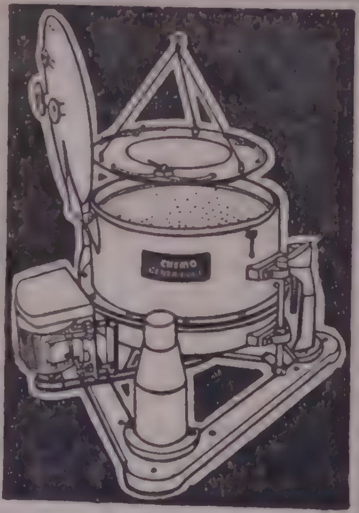

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New Products

CARBON LINED REACTION VESSELS

Blast Carboblocks Pvt. Ltd., New Bombay have recently started manufacturing BCARH A1 Carbon lining under process license from M/s. Bhabha Atomic Research Centre for use under severe chemical corrosion from subzero to elevated temperatures upto 300 deg C. and simultaneously giving a good heat transfer if so desired. It is claimed by the manufacturer that this renders the use of glass lined or SS vessels needless in many applications encountered in the pharmaceutical and dyestuff industries. The carbon tiled reaction vessels made of MS are very economical compared to GL/SS Vessels and can be made available in short delivery period. Lining can also be done on existing old MS/SS/GL/lead bonded vessels. Technical advantages are:

- Excellent corrosion resistance to a wide range of chemicals as H_2SO_4, Chloro Sulphonic Acid, Acetic Acid, Alkalies, Xylene, Benzene, Toluene, CCL_4 etc.
- Good heat transfer from jacket to vessel upto 300 deg. C. The heat transfer is between mild Steel and SS.
- Excellent Thermal Shock Resistance.
- Long operating life comparable to Glass
- Ease in maintenance and repair of the lining.
- Heating or cooling can be done with equal ease.

In view of the above many intermediates dye chem industries, pharmaceutical industries, heavy chemical industries, have already started getting benefit of this new development.

More details can be had from Blast Carboblocks Pvt. Ltd., sector 21, A1/91/1, Turbhe, New Bombay-400 705.

ELECTRONIC SOFTSTARTER & ENERGY SAVER

JELTRON Series SSI Electronic Softstarter & Energy Saver, apart from effecting a softstart to 3-phase AC Induction Motors so that the motors accelerate smoothly and uniformly to their rated speeds in an adjustable built-in ramp-up time of 2 to 30 seconds, also monitors continuously for load and line voltage variations and effectively feeds the motors with input voltages just sufficient to drive the loads at different instants under cyclic varying load conditions. Thus, the microprocessor based control dynamically adjusts the input voltage to the motor to optimize the motor efficiency. The complete cycle of continuous sensing of the motor load and the corresponding adjustment of the input voltage to the requisite level is done in less than 200 milliseconds. In such applications, where the motor is operating under reduced load or no load conditions for most part of the cyclic period, the use of JELTRON Series SSI Electronic Softstarter and Energy Saver results in considerable savings in the energy consumed, apart from enhancing the life of the motor and the drive train, and thus, pays back itself by way of savings in energy costs over a period of time. Besides energy savings and softstart features, the other standard features are phase loss protection, shorted SCR detection and voltage transient protection. Optionally, adjustable thermal overload protection can be provided. The Series SS1 units are available for use with 3-phase, AC Induction Motors from 5 HP to 700 HP.

Further details can be had from : Jeltron Instruments (India) Pvt. Ltd., 6-3-190/2, Road No. 1, Banjara Hills, Hyderabad-500 034.

PROGRAMMER CONTROLLER

Jeltron Model 814A Programmer Controller is a self contained microprocessor based set point programmer and a single loop industrial controller combined in one compact case. The 814A accepts directly process variable inputs from TCs, RTDs, transmitter voltages and currents and Optical Radiation Temperature Detectors. All temperature inputs are linearized and direct reading in degrees F or C, switch selectable. All transmitter units are field configurable in engineering units, from 999 to 9999 with full decimal point positioning. All programme parameters such as Range Limits, Set Points, Ramp Times and Soak Times are entered in full engineering units. Times are user configurable from 0.0 to 99.9 hours or minutes. The 814A is a single channel instrument that can store a maximum of 30 segments, which can be derived into a number of different programmes. Individual programmes can be fully independent or linked. A loop instruction allows the segment or any combination of segments to be repeated upto 99 times. Complete programme configuration are stored in solid state non-volatile EAROM. The 814A is available in wide choice of Control outputs. Reverse acting or direct acting control action is switch selectable. Integral Auto-Manual Station standard with bumpless transfer from auto to manual. Remote/Local set point operation is standard. The remote set point input is automatically scaled to the field configured range of the controller. Optionally, RS-232C of RS-422 communication interface is available for supervisory control L. E. D. A digital bargraph continuously displays deviation from set-point. Set Point, control output and configuration of pararmeters are viewed using the main display. Segment number as well as Set Point are continuously displayed on big LED indicators. Time remaining in the segment is also available for display. Programme status is indicated on the front panel and Programme security is assured using a front key lock.

Further details can be had from : Jelton Instruments (India) Private Limited, 6-3-198/2, Road No. 1, Banjara Hills, Hyderabad-500 034.

MOLYTEK 8402 PROGRAMMER & CONTROLLER & RECORDER/DATALOGGER

Model 8402 PCR from Molytek, Inc., USA combines the features of Programmer/Controller/Recorder into a powerful and flexible closed loop controller for industrial process and laboratory control. This 32 channel controller offers more than PID by allowing the gain in the proportional band to be programmed as a function of the error signal. Accepts 8 Analog inputs, any mix of mA, mV, Volts plus any type of TC or RTD. Current Source for RTDs is available as option. Open or Closed Loop Control from four independent output channels giving 0 to 5V or 4 to 20mA. Any output can control any system parameter like temperature, pressure, flow, pH, etc. Manual or Automatic multimode control including PID, PI2 (error squared), PIS (sampling average), Ratio, Internal or External Set Point, Cascade PID (upto 4 loops in 1) and Molytek Adaptive PID (user entered table of gain Vs. error signal). 40 Ramp and Soak segments with one second time base resolution can be programmed into every output channel (fixed set points and profiles from external sources also accepted). Inputs, outputs, Set-points, error signals and profiles are recorded in real time. All the 32 channels are scanned in 1 second. Both RS-232 and 20mA current loop for computer communication are standard. Includes floating point math for addition, substraction, multiplication, division, time average, square root, integration and Fo. High-low, high-higher, low-lower or rate of change alarm provided for every input by 2 set points. The 8402 Models are also available as Remote Transmitting units (RTUs) for use in Distributed Process Control System.

Further details can be had from Jeltron Instruments (India) Private Limited, 6-3-190/2, Road No. 1, Banjara Hills, Hyderabad-500 034.

HFC plant's output falls

The Namrup plant of the Hindustan Fertiliser Corporation (HFC), using natural gas as the feedstock, has been forced to cutback its production because of the non-availability of gas in required quantities even as an unspecified amount of natural gas worth over hundreds of thousands of rupees is flared every day all over north-east as there are no takers for it.

The Namrup plant depends by and large on Oil India Limited for its supply of feedstock. About 65 per cent of the plant's requirement is met from supplies from Naharkatiya and Moran oil fields of Oil India, the balance 35 per cent being from ONGC's Lakwa field.

While the Namrup plant authorities do not have much problem in regard to supplies from ONGC, frequent interruption in supplies from Oil India's fields have hit hard the production of the plant.

The ministry of petroleum had committed gas supply of about 42 mmscfd for the third unit of the Namrup plant in addition to about 38 mmscfd committed earlier for first and second units. In other words, Namrup was to get about 80 mmscfd of which about 16 mmscfd was to come from ONGC's Lakwa field and the balance about 64 mmscfd from Oil India's fields.

However, for the past several months, the plant has been getting much less than what was committed from Oil India's fields. Thus in the month of May, the supplies from Naharkatiya field was in the region of 43 to 45 mmscfd and from Moran around 9.5 mmscfd.

As a result, the production in ammonia plants of the first and second units had to be brought down to minimum and load in the urea plant of the second unit had to be reduced to contain the fall in pressure.

Gas supplies dropped sharply in the next month to about 36 mmscfd from Naharkatiya and to 7.5 to eight mmscfd from Moran.

INDO-US BILATERAL RELATIONS TO INCREASE

Recent political, diplomatic and trade events indicate possibilities of greater degree of Indo-US bilateral relationship, according to H.E. Mr. John Eddy, the U.S. Consul General from Bombay. Mr. Eddy was addressing the Mg. Committee of Federation of Gujarat Mills & Industries, Baroda, on 6-11-87. As on today, U.S.A. is India's largest trading partner with a trade surplus of $ 900 million in its favour, said Mr. Eddy. He described the last meeting of Mr. Rajiv Gandhi, the Indian Prime Minister, with Mr. Reagan as significant in forging an enduring relationship. Besides, he said, the recent visits of the U.S. Defence Secretary and other top-ranking officials to India shall pave way for a strong and solid base of Indo-US partnership. The interest envisaged in the vast and virgin Indian markets by large Americal Corporations like Dupont, Searle, Xerox and others shall double the existing American investment at $ 500 millions, in the coming years.

Commenting on the Super Computer deal, Mr. Eddy said that the machine being given to India is no different than its later model, and which reflects American intention to develop bette relationship with India.

On the recent American Stock-exchange crash, Mr. Eddy opined that is bound to have repercussions on American economy. He even expressed that the dollar might still go down further in its relation to the other World currencies.

Earlier, Mr. Pankaj Kadakia, President, FGMI, said in his welcome address that there is a bigger need to lift trade barriers to Indian industrial products by USA. Mr. Kadakia lauded the role played by the U.S. Government in encouraging bi-lateral trade between the two countries. Mr. Kadakia offered to host, through the FGMI, a buyer — seller meet between Indian and U.S. businessmen in Baroda sometime next month.

Mr. Jal Patel proposed a vote of thanks.

USSR RESEARCH IN POLYMER TAPES

Diplen, an adhesive two-ply polymer tape, can replace traditional dressing and even has curative properties. It can be antiseptic, analegestic or styptic, depending on what biologically-active substances are introduced in its lower adhesive layer, which dissolves in water. The tape can contain any drug, such as antibiotics, vitamins, etc.

This innovation is being used at the Soviet Republican clinic in Yerevan. Scientists there are working to develop such tape as would help in treating diabetes, for instance. It would be applied to the skin and the insulin it contains would immediately penetrate into the blood, thus obviating the need for injections.

N. T. IYENGAR M. D. OF THIRUMALAI CHEMICALS

The board of directors of Thirumalai Chemicals has appointed Mr. N. T. Iyengar, a director of the company as Managing Director for a period of five years with effect from January 1, 1988 subject to the necessary approval of the Union Government and members of the company in extra ordinary general meeting held on December 17.

rugs under categories I & II : revised prices in a few days

Revised prices of bulk drugs and mulations coming under price con- l will begin to be issued in the next v days, it is reliably learnt in New lhi.

The government expects to com- ite issuing price revision orders of drugs under categories I and II with- month.

The decision to go ahead with price vision unilaterally was taken by the vernment since most drug compani- failed to submit applications for ce revision even two months after New Drug Price Control Order, PCO), came into effect. The drug its were caught up in differences er trade margins with retailers and olesalers, and did not appear inter- ted in taking any action on the cru- l pricing aspect.

Official sources point out that eedy price revisions will benefit con- mers since in many cases prices of ugs will be reduced.

According to the new formula, mark- for category I drugs it will be 100 cent. In several cases, drugs which re enjoying a mark-up of 100 per nt in the old DPCO will now have a ver mark-up of only 75 per cent.

Even in the case of drugs where pri- s may have to be increased, the an- uncement of new rates will remove certainties and improve availability the market.

The government is, however, disap- inted with the lacklustre response the drugs industry to the DPCO. en though the new policy has brou- a large number of drugs outside ambit of price control in order to courage higher production, most g companies are still interested in aying any decisions on prices of ugs in categories I and II. Evidently, is felt, the industry is merely keen making higher profits at the ex- nse of the consumer.

Only about six or seven drug units ve so far come forward and filed ap- cation for price revision on the ba- of the changed MAPE (maximum owable post-manufacturing expen-) in respect of price-controlled ugs. In the case of all other com- nies which produce category I and drugs, the government has had to a view on changing prices with- consulting the manufacturer.

Under the new DPCO, category I consists of 27 drugs used in the national health programmes except for seras and vaccines. These include anti-TB and anti-leprosy drugs, oral rehydration salts and drugs needed for malaria and filaria eradication programmes.

The category II drugs cover another 139 drugs which include antibiotics, vitamins and other important drugs.

Among the areas which have been exempted from price control now are all vitamins as bulk drugs, all single ingredient vitamin formulations containing individual vitamins specified in category II and sold either in brand name or in generic name and single ingredient formulations based on bulk drugs specified in category II and sold under generic name.

BOOK REVIEW

THE DRUG (PRICES CONTROL) ORDER, 1987 WITH COMMENTS

The Drugs (Prices control) order, 1987 being the instrument in the hands of the Govt. of India to control the day to day working of the pharmaceutical companies, the changes brought about in the new DPCO 1987 need a detailed study on the new pricing policies and have clear understanding on the implementation of the provisions contained therein.

Published by Sri G. S. Rao, a Senior Cost Accountant in Bombay this book, the first to contain the comments, has brought out the salient points on working of the changed provisions with a comparative study and analysis of the proposed price mechanism.

Mr. Rao's attempt to present the possible implements in operation of new DPCO 1987 provisions well received by the members of the profession, is a useful guide to all connected with the industry.

The publishers' proposed "Loose Leaf Service" to supply the amendments, notifications, orders etc. which are likely to follow in future, is a facility to make this serve as a reference book, which the individual companies can take advantage of.

Pages 52, price Rs. 20 plus postage and Rs. 20.00 for Loose Leaf Services, available up to 31-12-88.

Copies can be had from : Sharavathi Management Service, C5/19-31, Sector 5, CBD, New Bombay-400 614.

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UNINTENDED PROFITS :

2 Drug co.s make part payment

Cyanamid and Hoechst have, under protest, made part payment of the amount demanded by the Government on account of their charging higher prices for indigenously manufactured bulk drugs and formulations than those allowed by the Government.

This follows the recent visit of a team of Government officials to more than 10 concerned drug units. The team is expected to have further discussions with these companies later this month.

The question of recovery of "unintended profits" was in the air ever since the Supreme Court's landmark judgement earlier this year (In what has come to be known as the Cynamid case) upholding the Government's justification for price fixation.

The Union Government, it may be recalled, had arbitrarily fixed the price of bulk drugs, rejecting the companies recommendations supported by relevant cost data. The industry had pointed out that in a number of cases, the prices fixed by the Government were below the ex-factory cost of the concerned drug.

When the Government failed to respond to the industry's representations for reconsideration of the matter, the concerned units moved the court. The Delhi High Court quashed the Government's price notifications in the ground of failure to observe the principles of natural justice.

These companies had given an undertaking to the Court that they would deposit the entire amount of difference in the event of their petitions being dismissed by the Court.

The Supreme Court overthrew the High Court ruling. It described price fixation as a purely "legislative activivity". As such, it is not subject to principles of natural justice, it observed. According to industry sources, the Supreme Court was influenced by the widespread impression of profiteering by drug companies. "Profiteerin
by itself is evil — it is a menace whi
ch has to be fettered and curbed —
the Court had ruled.

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DOUBTS OVER REVISION ON DRUG PRICES BY DEC.

Industry sources express surpris
over the Government's statement i
the Lok Sabha recently that drug price
would go up by 10 to 20 per cent nex
month when the existing prices woul
be revised.

The new DPCO, sources point ou
has not been even partially implement
ed. The Government has to revise th
conversion norms, bulk drug prices an
process hundreds of price revision ap
plications before new prices can tak
effect. Moreover, the dispute ove
trade margins is still unresolved. "I
will be a miracle if prices can be re
vised in a month's time, sources said

Meanwhile, unconfirmed reports sug
gest that the committee set up by th
Ministry of Chemicals and Petrochemi
cals to revise conversion norms, head
ed by Dr. D. K. Sankaran, is consider
ing exemption of small-scale units. I
may be recalled that the small dru
manufacturing unit have already bee
exempted from the provisions of DPC
1987 with regard to formulations i
Category II.

The committee is expected to fina
lise new conversion norms by January
The prevailing conversion norms i
respect of packaging, administration
marketing etc. date back to 1974. Th
industry has been complaining that es
calation in these costs, added to va
rious Central and State levies, ha
made a mockery of these norms.

PERSONALITIES

K. P. MOHANDAS RAO

Mr. K. P. Mohandas Rao has bee
elected chairman of the Process Pla
and Machinery Association of India
Mr. R. D. Hariani and Mr. V. A
D'Souza are deputy chairmen.

C. P. DANTHI

Mr. C. P. Danthi has been promo
ed as commercial controller of th
Bombay Oil Industries Private Lt
Earlier, he was commercial manage
Mr. R. V. Bindumadhavan is operation
controller

a rapid wrap-up of what's new in operations, processes & products

Electrochemical reactions

D. Hughes has given a brief account of work at the E.C.'s joint research centre in Ispra, Italy. An electrochemical flue gas desulphurization process has been developed where a solution of Bromine absorbs lean SO_2 to give HBr and $H_2 SO_4$; aq. HBr is electrochemically converted to H_2 and Br_2 and the latter is recycled. Pilot scale trials are due to start next year in Sardinia.

High mass transfer rates are crucial in organic electro-synthesis and a new dished electrode membrane (DEM) cell has been developed. It is a conventional plate-and-frame arrangement. Reactions like reduction of 2-methyl indole to 2-methyl indolene hold promise.

New noble metals coatings include stoved Pt, electroplated Pt/Ir, Ir oxide, PbO_2, etc.

Indirect synthesis, e.g. ceric sulphate to oxidise naphthalene to naphthaquinone and electrochemical oxidation of cerous to ceric is gaining importance (*Chem. Engr.*, U.K., 1987, No. 440 (Sep.), p. 18).

Electrolytic Industries : 1986

Tilak and Van Zee have given an exhaustive account of this subject in the well known *Journal of the Electrochemical Society* (1987, July, 279C-316 C). The first topic is caustic-chlorine where the U.S. production was 10.5 million tonnes/annum. Showa-Denka has developed a new ion exchange membrane that is being installed in a 120,000 tpa plant in Japan. In 1995, 20% of world capacity is expected to be based on membrane processes.

The U.S. Aluminium production was 3.35 mtpa. Alcon has announced a new venture in aluminium composites to make silicon carbide reinforced aluminium. The purified $AlCl_3$ process, via carbochlorination from inexpensive Kaolin clay, is being further refined.

Nuclear metals have developed a new seamless Beryllium structures that will compete with graphite composite parts in aerospace uses. For chromium, in Japan, experiments on melt reduction of chromium ore for the direct conversion to ferrochrome are being pursued.

For copper ICI and other associated companies will build and operate a demonstration plant in Spain based on cuprex process (using sulphide ores). Here chloride leaching and electrowinning are practiced. Solvent extraction procedure uses a patented ICI-reagent -- a pyridine dicarboxylic acid ester that selectively extracts Cu from a mixture of metal ions in solution.

Lithium metal continues to attract attention -- largest use is in ceramic, glass and TV tubes. The use of Li_2CO_3in cryolite bath reduces power consumption.

An improved process for the recovery of Mg metal from the silicothermic process has been recently patented; the process is able to operate in a continuous manner.

Cummings Engine Co. is expected to be the first commercial consumer of a new patented Ni-Al alloy for use in diesel engines; the new alloy does not contain any Cr or Co.

U.S. Bureau of Mines' Salt Lake City Research Center have developed a supercritical CO_2extraction method to separate $TiCl_4$ for tough-to-remove impurities (Al + Fe chlorides).

Ti clad steel has been developed by Nippon Kokan K.K. for chemical tankers, pressure vessels, offshore structures, etc., a hot rolling process is claimed to be suitable. Nippon S.K.K. has develoed titania-silica based porours solid acid molding that are compound oxides containing Ti and Si and have unique adsorbing, catalytic and ion-exchange functions, which zeolites lack.

Zn-Al alloys will become important materials and new ones include suspension and axle components, housing, bearing, transmission components, etc. Nippon Kokan has developed a Zn-Mn alloy electrodeposited steel sheet having better corrosion resistance than conventional electrodeposited sheet.

Biocatalytic reactions in two-phase systems

The yield of the end products of biocatalytic reactions in the two-phase system can, in principle, be much higher than in either water or an immiscible organic phase used separately. This methodology was suggested about15 years ago and in the recent past has attracted a lot of attention. Initially the object was to realise high level of conversion for water insoluble compounds, particularly steroids. Subsequently Russian workers, particularly Semenov, showed that the two-phase system can be adopted to shift chemical equilibria favourably (e.g. in making esters, peptides etc.). A.N. Semenov **et al.** have give a concise account of this subject in the inaugural issue of a new journal -- *Biocatalysis.*

A theoretical analysis has revealed that the maximum value of the apparent equilibrium constant for the second-order reaction in a two-phase system can exceed the equilibrium constants for the pure phases taken separately by a factor of $10^4$and even more.

The experimental study of alpha-chymotripsin-catalysed synthesis of N-benzoyl-L-phenylalanine ethyl ester from ethanol and the corresponding acid provides an interesting picture. In water the yield of the ester is neglibly low. In a two-phase system the yield approaches 100%. (*Biocatalysis,* 1987 **1,** 3-8).

In a follow-on paper K. Marbinek **et al.** have discussed in an elegant way the role of reversed micelles for synthesis of a variety of compounds.

Micellar enzymology studies the catalysis by enzymes entrapped in hydrated reverse micelles of surfactants in organicsolvents. A remarkable rise in activity, leading to 'super activity' is observed. (Activity of peroxidase, acid phosphatase, laccase, etc. has been shown to increase greatly. Applications in analytical areas, fine organic synthesis, bioconversion of energy and mass, therapy, protein chemistry, etc. are covered in this mini treatise. The most promising examples appear to be the conversion of progesterone by a multi-enzyme system; prostaglandin catalysed synthesis of prostanoids, etc. Recently the apparent solubilization of bacteria in reversed micelles has been reported. (*Biocatalysis,* 1987, **1,** 9-15).

Pereira, Tigli and Gryte have given a mathematical analysis of two-phase mass transfer in a batch reactor for the conversion of the slightly water soluble steroid testosterone to 4-androstene-3,17,-dione by an enzyme in the presence of excess co-factor. High concentration of the steroid were maintained within poly(dimethyl siloxane) beads. The product steroid is recovered in the polymeric beads. (*Biotechnology Bioeng.,* 1987, XXX, 505).

Enzyme is organic synthesis

This subject is receiving a lot of attention as enzymes are highly selective, provide high enhantioselectivity, operate under mild conditions, etc. The Novo process for the production of semi-synthetic insulin provides the first example of the use of modified proteins through R DNA technology. Purification of enzymes may be necessary when high enantioselectivity is desired. Optmisation of reactor design, which may well require the use of hollow fibres, merits a lot of attention. Chiral epoxy alcohol provide a good example. Racemic glycidyl butyrate can be resolved through the use of pancreatic lipase or cholesterol esterase. The value of enzymes in manipulating amino acids, sugars, oligosaccharides, poly peptides, etc. is great. The most plausible application of enzymes for large scale use may be for hydrations/dehydrations. For instance hydrolysis of acrylonitrile to acrylamide. The use of enzymes in two-phase systems and supercritical fluids merits attention. (Akiyama **et. al.,** *Chem. Brit.,* 1987, July, 645).

Lipase catalysed ester exchange reactions continue to attraction attention. Goderis **et al.** have studied the activity of immobilized ipase in organic solvent systems of controlled humidity. The interesterification of triolein and palmitic acid was studied (cocoa butter subtitute is obtained through this type of process). (*Biotech. Bioeng.,* 1987, **30,** 258).

The role of the second liquid phase, namely octane, in steroid conversions by **Flavobacterium dehydrogenans,** has been brought out elegantly by Boeren and Laane. The use of octane gave a 6-fold increase in the rate compared to the use of aq. medium alone. A high degree of conversion approaching 98%, can be realised in two-phase system and this is not realised in aq. system (*Biotech. Bioeng.,* 1987, **29,** 305).

Electrochemical Hydrogenations

Baizer and co-workers have carried out hydrogenation of aq. glucose and xylose to sorbitol and xylitol, respectively, in a divided H-cell with a variety of Raney-Ni type catalysts. In the case of Sorbitol 39-63% current efficiencies were realised with Ni-Mo and Ni-Co alloy catalysts. For benzene an active Raney Ni powder cathodes was used; 1M Benzene aq. solution was obtained by using 2.6M tetraethyl ammonium p-toluenesulphonate as a hydrotrope. (A.I.Ch.E. Symp. Series, 1987, **83,** No. 254, 34-39).

Desorption of CO_2 from loaded DEA solutions

There is a general dearth of data on desorption with reaction. Bouananz **et al.** have made a experimental study and modeled CO_2 desorption from loaded DEA solutions in a tray column. Vaporization of water is gas film controlled. The model has been modified to consider the effect of H_2S as well. A 5 cm dia, 20 tray column was used and DEA was about 3.2 M. (*Entropie 1986,* No. 128, 3-12).

Separation Technology: Second International conference: April 1987

The Engineering Foundation had organised this Conference in W. Germany where seven different sessions were held: Membrane separation processes; Solvent extraction of metals; Solvent extraction of organics; Bioseparations; Separation of solids; Adsorptive separations; Overview and future directions.

The use of bacterial cell walls as filtration membranes appears to be a promising new possibility. For condinuous fermentation the utility of perevaporation may be high; crystalline polymers as membrane may be useful.

Solvent extraction of metals continues to attract attention and supported Liquid Membranes appear to be efficient and this can be combined with hollo fibre technology. Supercritical fluid extraction has proved its utility for hops, coffee, tea etc.

The use of reversed micelles for the recovery of proteins is attracting attention; pH is an important parameter. The continuous cross current extraction of fumarase in a two-stage process using a polymer (PEG) was covered in the Conference.

The use of cyclodextins for forming inclusion complexes with bio-products like phenyl alanine, lactic acid, etc. merits consideration.

Adsorptive separations with complexing ion exchange resins are gaining importance for dilute solutions of metal ions. The use of Chitosan has also been considered. Pressure swing adsorption with carbon molecular sieves is a recent development. (*Swiss Biotech.* 1987, **5.** No.3, 7-11).

Methyl isopropyl (MIPK) and diethyl ketone (DEK) from methylethyl ketone (MEK)

BASF have claimed that MEK and methanol can be reacted at 550°C over MgO catalyst to give MIPK and DEK in approximately 1:1 ratio. (*Ger. Offen.* 3,542,297, June 1987; *Chem. Abstr.*, 1987, **107,** 595).

Selective para chlorination of phenols

Rhone-Poulenc have claimed that the presence of a small amount of Ph_2S changes the product distributions of chlorinated phenol. Thus chlorination of phenol at 50°C, at 72-7% conversion, gives 66.5% para chlorophenol, 21.7% ortho chloro phenol and other products **vs.** at 75.5% conversion to 54.5% para and 34.3$ ortho. (Fr. Demande 2,584,088, 1987, *Chem. Abstr.,* 1987, **107,** 115354).

Phenol to Catechol + Hydroquinone

Degussa have claimed that hydroxylation using H_2O_2, in the presence of SO_2 or SeO_2, at 87°C, give catachol and hydroquinone in the ratio of 1:0.55 and a yield of 84% based on H_2O_2. (Belg. Pat. 906,063 June 1987, *Chem. Abstr.*, 1987, **107,** 115360).

Organic esters from halohydrocarbons

Dow have claimed that a mixture of AcOH and NaOAc in propylene dichloride reacts to give propylene glycol diacetate with selectivity of more than 80%. (Ger. Offen. 3,545,583, 1987; *Chem. Abstr.*, 1987, **107,** 115251).

Catalysis in aliphatic isocyanate-alcohol reactions

Squiller and Rosthauser have discussed the use of catalyst for aliphatic diisocyanate-polyol reaction and compared these data with those for MDI, TDI, IPDI, etc., Dimethyltin dichloride, dibutyltin dilauryl mercaptide, dibutyl dilaurate, etc. are effective catalysts for isocyanates. The first catalyst is good for aliphatic diisocyanate. (*Modern Paint and Coatings,* 1987; June, 28).

Phase Transfer Catalysis (PTC)
Duel function PTC: H_2O_2assisted oxidation of styrene

Quarternary ammonium salts (QAS) assist the extraction of H_2O_2 as well as metal salts like Ru/Pd chlorides from aq. to the non-aq. phase. Styrene is oxidised to benzaldehyde and formaldehyde/formic acid (O. Barak and Y. Sasson, *J.C.S. Chem. Commun.,* 1987, 1266).

Ammonolysis of alkyl and aryl halides

Barak and Sasson have shown that QAS improve the solubility of ammonia in organic media and accelerate its reactions with some alkyl and aryl halides. The reaction between ammonia gas and 2,4-dinitrochlorobenzene in toluene is greatly accelerated by using tetra n-butyl ammonium bromide. (*J.C.S. Chem. Commun.,* 1987, 1267).

Colloidal Lubricant Additives (CLA)

Marsh (From Exxon, U.K.) has given a nice account of this subject. The hydrocarbon oil is required to function in a very hostile environent; high temperatures, high shear stress, chemical attacks, etc. are encountered. Lube oil also degrades resulting in viscosity increase and sludge is also formed. Oil additives are meant to overcome the above and some related problems. An effective acid-neutralising additive should have the following features: strong base; stable after reaction with acid; neutralisation product not harmful; clear stable oil solution; etc. colloidal dispersions of inorganic carbonates fulfil most of the requirements. Typically the wt. % of carbonates is 20 to 35 (volume % 8 to 15) and the surfactant are 18 to 30% (by wt.); carbonate particles are typically 60 A° in dia. and the surface layer thickness of the surfactant is 20 A°.

Manufacturing processes are generally batch and consist of the following types: (1) solvent-free process (2) oxide/hydroxide process. In the second process perhaps a microemulsion of polar solvent and water in hydrocarbon solvent and oil is involved. Solid calcium hydroxide is taken in the above medium and as carbonation proceeds colloidal $CaCO_3$ particles are formed. The high degree of mono-dispersity in the final product indicates that the particles growth stops at a certain size.

The size of colloidal particles and surfactant layer thickness can be determined by small angle neutron scattering. (J.F. Marsh, *Chem. Ind.,* 1987, 20, July, 470).

Mixing : Interesting case histories

There is a useful write-up on some case histories which include solids suspension in large tanks, reactor mixing, erosion of ruber-lined impeller blades in an abrasive application, mixing in liquid-liquid extactions.

Mixing Company of USA gave an example of mixing at 78% (wt) uranium containing solids suspension in 12 m dia. tanks. Here a small change in the original impeller dia brought out undesirable results. Hoechst-Celanese had a batch reactor for catalysed direct esterifications. It turned out that the introduction of gas and the generated vapour prevented the pitched-blade turbine from providing adequate fluid circulation and solids suspension. This problem was overcome by adopting a dual-impeller system; a radial flow impeller (flat-blade turbine) was placed just below the liquid surface, and an upward pumping, pitched blade axial flow impellar was placed near the bottom of the vessel. Du Pont suggests for TiO_2 slurry tanks the following configuration: a four-bladed, pitch-bladed turbine at the tank's mid point.

Sometimes inadequately sized pipelines to the mixer can jeopardise good mixing. Erosion of blades can be troublesome in mixing of solids slurries. In a specific-ore-slurry application, the substitution of four high-efficiency blade for three pitched blades on an impeller doubled or tripled the life of the rubber covering.

In an extraction column the change in the difference in the density of the two phases was fairly large to cause recirculation of liquid. Heavy phase was converted from dispersed to continuous phase in a large reciprocating column and the problem was solved. (*Chem. Eng.* 1987, **94**, No.9, (22 June), p.32).

Resolution of optical isomers through sublimation

Leo Paquette has shown that two forms of **anti** 7-norborneol can be resolved via sublimation. (*J. Org. Chem.,* 1987, **52, 1634**).

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CATALYST PRODUCTION :

PDIL plans modernisation

Projects and Development India Ltd. (PDIL), which has developed catalysts for fertiliser and some other Industries has decided to go for modernisation of catalyst production facilities.

The decision was taken in view of anticipated rise in demand for catalysts in the country in the coming years following creation of additional fertiliser capacities.

The company headquarters at Sindri, near Dhanbad, in the coal-belt of Bihar, plans to expand the export market after implementation of the modernisation scheme.

At present, it has "no scope for export because of production limitation". The existing facilities being old cannot cope with the present as well as the projected catalyst demands, it is felt.

According to its house journal, PDIL had supplied several "charges" of various catalysts to Bulgaria some years ago. The journal has quoted its general manager, Mr. B. B. Roy, in this connection.

The company which began manufacturing and marketing almost all varieties of catalysts required for the fertiliser industry by the middle of 1960s is supplying catalysts to both private and public sector units. The demand today surpasses the production capacities.

The fertiliser catalysts produced by PDIL include primary gas reforming, secondary reforming, zinc oxide, high temperature shift, low temperature shift and methanation catalysts.

In addition to these the company manufactures catalysts required in chemical and petrochemical industries. Some of these catalysts are used for manufacturing acetaldehyde, butanol etc. From a modest beginning in the sixties the annual turn-over had increased to Rs. 700 lakhs last year.

Some of the catalysts produced by the company are claimed to be even superior than international brands. The Pt-shift catalyst is given as an example — citing another example, the journal says, "performance of our methanation catalyst at that has proved to be far superior to that of the imported variety".

DELAYS IN FERT. PLANT : RS. 82 LAKHS LOST

The Hajira-Bijaipur-Jagdishpur (HBJ) pipe-line is incurring a daily loss of Rs. 82 lakhs on account of delay in utilisation of gas by the proposed fertiliser and power plants. This was disclosed by Mr. Dutt during question hour.

He told Mr. Shanker Singh Vaghela that all efforts were being made to see that the downstream units come up in time.

Giving a break-up, the Minister said losses due to delay in fertiliser plants was to the tune of Rs. 37 lakhs per day, while it was Rs. 45 lakhs in case of power projects.

He assured the members that the HBJ pipeline would be ready in all aspects by July, 1989.

Replying to supplementaries, Mr. Dutt hoped that the original estimate of little over Rs. 1,700 crores for the pipeline would not be exceeded.

He said apart from Gujarat, gas from the Bombay High would be supplied to Rajasthan, Madhya Pradesh and UP for setting up six fertiliser and two power plants based on this gas.

Of these, three fertiliser plants at Sawaimadhopur, Babrala and Shahjahanpur were expected to be delayed on account of getting clearance from environmental angle and consequent delay in the acquisition of land and other site-related activities.

The Minister explained that the loss to the exchequer on account of royalty and sales-tax could not be estimated at this stage, particularly because the extent of delay in the above three fertiliser plants was "not clearly known."

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Industrial Licences

The following is the list of industrial licences and letters of intent issued under the Industries (Development and Regulation) Act 1951 during August, 1987.

The name of the undertaking and the type of industrial licence, location, items of manufacture and the annual capacity are given in that order.

**Scheduled Industry No. 19 :
Chemicals**

Manali Petrochemical Ltd., 'Kothari Building', Nungambakkam High Road, Madras (NA); Manali, Chingleput, Tamil Nadu, Propylene Oxide, Glycol, 12,000 tons.

Hindustan Lever Ltd., Hindustan Lever House, 165/166, Backbay Reclamation, Bombay (NU); Etah, Uttar Pradesh, Plant Growth Nutrient, 2,000 tons.

Pyrapure Chemicals Ltd., Khetan Bhavan,, 3rd Floor, 198, J. T. Road, Bombay (NU); Ankleshwar, Bharuch, Gujarat, Decamethrin, Technical, 20 tons.

**Scheduled Industry No. 22:
Drugs & Pharmaceuticals**

Ranbaxy Laboratories Ltd., Sahibzada Ajit Singh Nagar, Distt. Ropar, (Punjab) (NA); Ropar, Punjab & Dewas Madhya Pradesh, Pentazocine (Bulk Drug) 3,000 kgs. Drugs formulations (based on bulk drug production of Pentazocine in Tablets and Injectables) 1650 kgs. (in terms of Bulk Drug requirements), (ii) Pentazocine HCL (equivalent to Pentazocine Base-15 mg), 450 kg, (iii) Paracetamol 13,230 kg.

LETTERS OF INTENT

**Scheduled Industry No. 19:
Chemicals (other than fertilisers)**

SM Dyechem Ltd., SM House, 11, Sahakar Road, Vile Parle (East), Bombay-400 057 (NA); Ghotewade, Mulshi, Pune, Maharashtra, 1. Man-made Fibre Preparations Fibre and Yarn Lubricants (Spin Finish Oil Ranges), 3,000 tons, 2. Base for Synthetic Soap bars (Sis Needle Form), 1,000 nos., 3. Super Fatting Agents for Cosmetic Preparations, 500 nos, 4. Glycol Ethers, 1,500 tons.

Hindustan Organic Chemicals Ltd., Rasayani, Dist. Raigad, Maharashtra-410 207 (NA); Rasayani, Panvel, Raigad, Maharashtra, Polyurethane Systems/Products, 10,000 tons.

Oswal Fats and Oils Ltd., 36, Regal Building, Connaught Place, New Delhi-110 001 (NU), Urai, Jalaun, Uttar Pradesh, 1. Fatty Stearic Acid, 10,000 tons, 2. Hard Oil (non-edible), 10,000 tons, 3. Glycerine, 9,000 tons, 4. Toilet Soap, 10,000 tons, 5. Oxygen-Industrial 4,00,000 cubic metres.

The Punjab State Industrial Development Corpn. Ltd., SCO: 54-46, Sector 17-A, Chandigarh-160 017 (NU); Kharar, Ropar, Punjab, Hydrazine Hydrate, 485 tons.

Rajendra V. Shah, 5, Build-well Santacruz (West), Bombay-400 054. (NA), Chiplun, Ratnagiri, Maharashtra. Finished Products: 500 tons, 1. Acetic Anhydride 2. Butyl Acetate, 1,200 tons, 3. Ethyl Acetate 2,100 tons, 4. Pentaerithritol 2,400 tons, 5. Sodium Formate, 2,000 tons, Intermediate Products: 6. Acetaldehyde, 3,600 tons. 7. Acetic Acid 3,000 tons, 8. Formaldehyde 3,000 tons, 9. Formic Acid (Converted From by-product Sodium Formate), 600 tons.

Gujarat Alkalies & Chemicals Ltd, Yashkamal Sayajiganj, Baroda-390 005 (SE), Ranoli, Baroda, Gujarat, 1. Caustic Soda Flakes, 26,400 tons, 3. Chlorine Gas, 1,20,740 tons, 4. Sodium Hypochlorite, 2,500 tons.

Cibatul Ltd, P.O. Atul-396 020, Distt. Valsad. Gujarat (NA), Atul, Valsad, Gujarat, Sulphanilic Acid, 300 tons.

The Atul Products Ltd., Post: Atul-396 020, Distt. Valsad, Gujarat (NA), Atul, Valsad, Gujarat, Triclocarbon, 100 tons.

Grasim Industries Ltd., Chemicals Division, Birlagram, Nagda-456 331, Madhya Pradesh (NU), Birlagram, Nagda, Tehsil Kahachrod, Distt. Ujjain, Madhya Pradesh, High Test Bleaching Powder/Granules/Tablets (High Test Calcium Hypochlorite), 5,000 tons.

Bordia Chemicals Pvt. Ltd., 31, Bajajkhana, Ratlam-457 001, Madhya Pradesh (NU), Ratlam, Madhya Pradesh, H. Acid, 400 tons.

Umesh Saraf, C/o. Asian Hotels Ltd., Bhikaji Cama Place, Ring Road, New Delhi-110 066 (NU), Centrally declared backward Distt., Gujarat, Bi-axially oriented polypropylene film, 2,000 tons.

Ashok Chauhan, AKC House, E-27, Defence Colony, New Delhi-110 024 (NU), Noida, Ghaziabad, Uttar Pradesh, Bi-axially oriented polypropylene film, 2,000 tons.

Kanoria Chemicals & Ind. Ltd., 16-A-Brabourne Road, Calcutta, Ankleshwar, Bharuch, Gujarat, 1. Acetal Resins, 2,000 tons, 2. Hexamine, 1,500.

KERALA-KONKAN OFFSHORE DRILLING BEGINS

ONGC has commenced drilling operations in Kerala-Konkan Offshore (KKO). The first well on the Cochin High structure on the KKO basin targeted to drill down to a depth of 4,500 metres was spudded on October 21.

KK shelf covers an area of about 77,000 sq. km. up to 200 metres isobath and 92,000 sq. km. upto 2,000 metres isobath.

The reserves of KKO basin are estimated at about 300 million tonnes. By the end of the Seventh Plan, ONGC plans to drill around 12 wells by deploying four rigs in this area.

Besides Bombay offshore, ONGC is presently drilling in West Bengal, Krishna-Godavari, Cauvery and Andaman offshore. The offshore resources are estimated at 9,710 mmt. Out of this, 2,320 mmt belong to areas other than Bombay offshore basin.

In the West-Coast itself, out of 176 prospects, only 90 have so far been tested. In addition to Bombay High, Heera, Ratna and Panna fields in the West Coast are contributing towards the total offshore production.

Since 1980, 21 oil and gas discoveries had been made in the West alone and efforts are being made to "crash their lead time for their development."

GAS LEAK IN ACID PLANT HURTS MANY

Many children and aged people suffered breathlessness following a gas leak from a sulphuric acid factory at Kaduvetti, near Poonamallee, 25 km from Madras November 11

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PROJECTS CLEARANCE :

Call to simplify procedure

The two-day eastern regional seminar on water resources development and environmental issues on November 10, recommended that the department of environment should scrap the present "sketchy" proforma and procedures for deciding the environmental aspects of projects awaiting clearance.

The department should instead evolve reliable mathodologies to study the environmental implications and also identify competant agencies to carry out the studies. The present method of evaluation was one of the major reasons for the inordinate delay n clearance of projects, the USAID-WAPCOS-sponsored seminar said.

Though the question of a national guideline did not feature prominently n the deliberations the seminar fell n tune with the recommendations of he other three regional seminar in cal-ing for "national guidelines policy" on ehabilitation of oustees from water esource development projects (dams).

But it took note of the regional sen-iment in adding a proviso that these an be "slightly modified" to meet roup and location-specific requirements. Thus it indicated that the imminent national meeting on this theme will call-for and later lead to national orms/guidelines on the vexing pro-lem of rehabilitation of populations isplaced by major projects.

Apparently as a consequence of the pecific requirements of the eastern egion, the seminar also recommended few more steps which constituted n addition to or departure from ear-er recommendations. These include tudies on river courses downstream f reservoirs and measures including hannelling and dredging to ensure hat the rivers do not outspill their anks, especially along the east oast, protection of mangrove forests the Sunderbans and other places hich cannot be ecologically replaced y other silvicultural alternatives, and teps to deal with acute drinking wa-r shortage in hill areas in the Nor--Eastern states.

The seminar also felt that unless it unavoidable, compensation for lost nd should be made by allocation of land elsewhere and not by cash. Wherever cash is paid, it recommended adoption of the system practised by Bihar in regard to the Subarnarekha project by involving banks so that the money is not frittered away by the recipients. It also recommended legislation, as suggested by Orissa, for ensuring transfer of land on safe in ayacut areas to oustees of the catchment areas.

In regard to waterlogging and ground water resources, it recommended that comprehensive studies on these should form part of the project concept and the cost of drainage included in the project cost.

The seminar stressed that in view of the advances in biotechnology and genetics, urgent attention should be paid to preservation of the vast genetic variety (in flora and fauna) available in the country and dissemination of information on the same. On compensatory afforestation, it called for regeneration of the ecological system concerned and search for efficient technologies to achieve the same.

BILL TO CURB AIR POLLUTION PASSED

The Lok Sabha passed a bill to amend the Air (prevention and control of pollution) Act, 1981, providing for stringent punishment to effectively prevent air pollution.

Replying to the discussion on the bill, the minister of state for forest and environment, Mr. Z. R. Ansari said it had become necessary to amend the act as it had certain lacunae.

The amended legislation would help in dealing with industries polluting the atmosphere and people responsible for it with a strong hand, he said.

About the pollution caused by motor vehicles, he said government was contemplating an amendment to the Motor Vehicle Act to control it.

All industries had been brought under the Air Pollution Act through the amended legislation, he said.

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EXPORT ENQUIRIES SOLICITED

New lube oil recycling unit to be set up

A Bombay-based medium engineering nit is entering the high tech. field of ecycling waste lube oil, an area so far ominated by FERA companies.

According to Mr. Rajinder Walia, rector, Surindra Engg., his company planning two units, costing Rs. 3 ore each with 5,000 tonnes per an- im capacity, at Rajpura in North In- a and the other at Mangalore in Kar- taka.

What had emboldened the company enter this area was its successful ecution of $ 10 million lube oil re- cling plant the contract for which as awarded to it by the Kuwait Gov- nment in 1985.

Mr. Rajinder Walia told "Financial press" that to secure the Kuwaiti ntract, he had to enter into a con- rtium with West German and Aus- an firms. While the German com- ny provided know-how, the Austrian mpany took care of the engineering le.

Having thus gained considerable ex- rience, the company had now recei- d Government approval for its appli- tion to set up waste lube oil recycl- plants, he added.

Mr. Walia said his company's con- oution in each plant would be Rs. lakhs. Financial institutions would contributing another Rs. 50 lakhs ch and the State subsidy in each nt would be Rs. 20 lakhs. For this rpose, the company would also make equity issue sometime in April 88.

For the Kuwait plant, Mr. Walia d supplied Indian equipment includ- piping, tanks pressure vessels and structural materials. Mr. Walia ad- d that there would be no foreign ex- nge outgo as the equipments would made available from indigenous rces.

Mr. Walia felt there was need for re waste lube oil recycling plants the country since over 100 million lons of lubricating oil, estimated at 300 crores, were being wasted ually in the country.

le said the waste oil would be col- ted from State transport depots, n used engine and gear oil and e oils released from ships.

alking about his present activities, said, Surindra Engg. was a pioneer the manufacture of thick walled pipes in lengths up to 8 metres. nanufactured these pipes from 16" 84" diameter without circumferential joints. The American Petroleum Institute (API) of the U.S. had granted the company the right to use its monogram.

These pipes, which were import-substitution items, were being widely used in petro-chemical units, water, oil and gas pipelines, in heat exchangers, shell for vessels and in ship building.

CALL TO SET UP GLOBAL CORROSION COUNCILS

The five-day 10th international congress on corrosion ended at Madras recently with the suggestion for the formation of National Corrosion Councils (NCC) in each country. Finland and Brazil already have such councils.

Dr. K. I. Vasu, director of the Central Electrochemical Research Institute of the Council for Scientific & Industrial Research (CSIR) the host for the congress, briefing newsmen on the outcome of the conclave, stated that the NCC should have collaborative arrangements with universities, academics, industries as well as organisations like the Ficci, Assocham, IMC and other professional bodies, besides user ministries like industry and transport.

It was also suggested to have corrosion audit of major plants in the country at regular intervals so that preventive measures could be taken.

Dr. S. Varadarajan, consultant to planning commission, addressing the plenary session advocated preparation of a report on corrosion of not only plants and factories but also historical monuments, temples and other structures.

CORROSION TESTING FACILITIES AT MANDAPAM

A three-day Indo-Soviet seminar on corrosion control in metals and alloys was inaugurated at the Central Electro-chemical Research Institute (CECRI) at Karaikudi.

In his inaugural address, Dr. M.N. Fokin, divisional head of the Institute of Physical Chemistry, Moscow, said information exchange, especially in the field of electrochemistry, was greatly benefitting both India and the Soviet Union.

Speaking to newsmen later, Dr. Fokin explained that the Soviet Union had corrosion research stations in a variety of atmospheric conditions. There were stations in the polar regions, industrial areas, desert regions and also in countries like Czechoslovakia, Germany and Poland.

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OIL'S 20-YEAR PERSPECTIVE PLAN :

Output may touch 74 M. T.

OIL India Limited's blueprint for 2000 AD envisages an investment of 9,950 crores and an estimated production of 74.75 million tonnes of crude from the known oilfields in Assam and Arunachal Pradesh. If additional new fields are discovered then the production potential will touch 92.11 million tonnes from these two states alone.

OIL has adopted a 20 year perspective plan titled "Exploration and production strategy 1985-2005" to harness the hydrocarbon potential of existing oilfields and the vast unexplored sedimentary basins. Stating this, Mr. Sujit Chaliha, chairman and managing director, OIL, said recently that on the basis of the blueprint a four-stage sequential and operative process had been planned.

They are the exploration and production programmes in the existing concession areas in Assam and Arunachal Pradesh to the acquisition of additional acreage both within and outside Assam and Arunachal Pradesh to establish an investment risk portfolio with assured profitability and growth commercialisation of already proven free gas reserves and further exploration to establish the unproved balance and identification of profitable investment opportunities in new oil and gas but energy-related ventures.

He said the production profiles for crude oil have been drawn up in the plan upto 2005 AD in the first variant A (based on the fields discovered as on January 1, 1987) production production profile of 18.71 million tonnes in the 8th Plan period, 20.92 million tonnes in the 9th Plan and 21.25 million tonnes in the 10th Plan period have been projected.

Likewise in the second variant B (based on new fields and also fields that may be discovered through intentensive exploration during the 20 years period) the production profile for crude oil is projected at 19.91 million tonnes, 24.80 million tonnes and 34.43 million tonnes respectively over the same periods.

Both these variants considerd are for production from Assam and Arunachal Pradesh only.

An intensive analysis of OIL'S existing assets in terms of manpower, infrastructure and logistics has been carried out to the year 2005. According to this analysis OIL's turnover in 2004-05 AD will be Rs. 870.001 crores in variant A (the 1986-87 turnover being Rs. 450.00 crores) and Rs. 1,425 crores in variant-B. He said the investment is expected to be of the order of Rs. 4,450 crores in variant A and Rs. 5,500 crores in variant B-thus making a total investment of Rs. 9,950 crores.

In the terminal year of the 10th Plan OIL'S crude oil and oil equivalent of gas (OEG) production is estimated to rise from 4.27 million tonnes in 1986-87 to 6.85 million tonnes in variant A and 10.50 million tonnes in variant-B. The profit before tax and interest which is Rs. 91.20 crores in 1986-87 will be Rs. 72.80 crores in variant-A and Rs. 248.21 crores in variant-B in 2004-05.

The additional manpower required to achieve this production would be over 5,100 persons in variant A and 10,400 persons in variant-B, over and above the existing manpower strength of 8542 persons of the company. The number of drilling rigs to be deployed in the terminal year of the 10th Plan will be 15 in variant A and 23 in variant B.

CACHAR BELT RICH IN HYDROCARBON RESERVES

The Cachar belt comprising Naga Luchai Patkai Barail ranges covering an area of 7,000 square km under Karimganj, Cachar and north Cachar districts of Assam has shown positive indication of a huge reserve of hydrocarbon.

An Oil and Natural Gas Commission spokesman said that ONGC has already discovered 8.32 million metric tonnes of hydrocarbon in the area and hydrocarbon resource appraisal study indicated a reserve of 460 million tonnes of oil and oil equivalent gas.

In view of this enormous potentiality of hydrocarbon reserve in the region, ONGC has envisaged plans to intensify exploration activities in the Cachar belt during the Seventh Plan itself, the spokesman added.

Ground surveys have so far led to mapping of 22 prospective structures in this region. Meanwhile, ONGC has set a target of producing 200 tonnes of crude daily from the next year. ONGC would also start drilling at Dhantran from January next, the spokesman said.

Two ONGC geological parties would delineate the structures mapped earlier and cover an area of 3,150 square km during the remaining part of the current Plan period, he said.

IMPORT LICENCE FOR ACTUAL USERS

The joint-director of industries, government of Maharashtra, has directed that under the new import-export policy of 1985-88 (Vol-I), the last date of receipt of application from actual user (industrial and non industrial) for supplementary licence by the sponsoring authority will be December 15, 1987 of the licensing year to which the application pertains.

In the case of new or proposed units the last date of receipt of application for supplementary licences by the concerned licensing authority duly recommended by the sponsoring authority is February 28, 1988. Last date of receipt of all other import applications will also be February 28.

INDIAN EXPORTS TO U.K. UP BY 20%

India's exports to the United Kingdom in the first eight months of the current year have registered a 20 per cent increase as compared with the corresponding period last year.

Leather garments, cashewnuts, textiles, garments, oil cakes, jute products, finished leather and chemicals worth £336 million have been exported to the U.K. as against goods worth £281 million during the first eight months of last year, a high commission release in London said.

Exports of chemicals and allied products showed a growth of 19.5 per cent. Exports of engineering goods showed a declining trend in the first quarter of this year. However, this trend has since been reversed and engineering exports recorded a growth of 17 per cent.

Two sectors, textiles and garments, and leather and leather goods account for 35 per cent and 12 per cent respectively of India's total exports to Great Britain. Engineering goods, oil cakes, tea, marine products and tobacco are the other major items of export.

New method to activate oil wells

The Oil and Natural Gas Commis- on (ONGC) has introduced an entire new technique for the activation of s wells. For the first time in the astern region in Assam a well in the akwa oilfield has been put on a plun- er lift system.

According to ONGC sources taking to account the present cost of crude t around $18 per barrel, it has resul- ed in a saving of about Rs. 3,12,000 er month in terms of foreign exchan- e.

The plunger lift is essentially an tificial lift system method and is spe- ially applicable in wells with low pro- uctivity and high formation gas liqui- ation ratio. A steel plunger contain- g the simple valve device is located the tubing string of the well at the ottom. A cushion seat with a hole provided at the string at the bottom nd the plunger rests on it.

When the plunger rests on the cu- ion seat the valve on the cushion eat the valve fitted in the plunger is losed and hence the tubing is closed its lowest end. As a result of the ow of oil and gas in the well, e pressure at the bottom of the lunger increases. At this point the lunger starts rising in the tubing.

And along with it the oil above the lunger also rises and is lifted up and roduced at the surface. At the upper end of the tubing a spring bumper is fitted. When the rising plunger reaches the top, it strikes its spring bumper. At that, time, the value in the plunger opens and pressure below the plunger is released whereafter the plunger falls down the tubing to the cushion seat. This cycle goes on repeating.

The highlight of this technique of oil production is that no external energy is required which is a direct saving on energy consumption. The production is due to the usage of the well's own gas energy.

In this case, the original imported plunger was modified to the extent to suit the well's energy.

Besides bringing about substantial savings in foreign exchange, the continuous movement of the plunger in the tubing results in non-deposition of gas in the tubing requiring less routine maintenance.

Several other innovations like dragging the rig, clustered drilling and modifications of the mast etc., have resulted in saving of costs in the drilling operations in the region. Amongst other measures which have been adopted include improving well productivity, systematic use of artificial lifts, adoption of early production of new discoveries, introduction of new technology areas like use of mobile work over rigs, endless tubing unit, nitrogen pumping units and other stimulation services, use of chemical deni leg etc have contributed in galvanising operations

The output of crude from the eastern region of ONGC has recorded a high jump from a mere 4.2 lakh tonnes in 1980-81 to 2.68 million tonnes in 1986-87. This represents an increase of 538 per cent in about seven years time. A still higher target of about 2.8 million tonnes has been fixed for the year 1987-88. By the end of 1990, ONGC plans to further raise its production to achieve a level of 4.1 million tonnes.

Another major success story has been in the field of gas supplies. During 1986-87, ONGC supplied nearly 94 million cubic metres of natural gas to gas-based power stations of the Assam State Electricity Board.

About 12.5 million cubic metres of gas was supplied to the fertilizer factory at Namrup. More than six million cubic metres of gas was also supplied to the tea processing units in Assam during this period.

This increased production has been the result of deliberate concerted efforts taken by ONGC. In addition to Lawka, Lakhamni, Geleki and Rudrasagar, new oil-fields have been established in the last three years. There are 8 oil-fields in Assam. They are Borholla, Champang, Amguri, Charali, Changmaigaon, Demulgaon, Kaurgaon and Namti in Assam.

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ONGC to hire four more mobile drilling rigs

The Oil and Natural Gas Commission (ONGC) has decided to charter hire four additional mobile drilling rigs in order to carry out its drilling operations under the Cambay basin petroleum project (CBPP).

According to ONGC sources, mobile drilling rigs are far more time and cost-efficient than the conventional rigs as they consume considerably less time in rig building operation. Already, the two mobile rigs deployed in the western region in Gujarat have shown a 40 per cent increase in drilling efficiency as compared to the conventional rig.

The charter hiring of the four mobile rigs involves a financial outlay of Rs. 31.83 crores.

Of the total 534 developmental wells to be drilled in the Cambay basin petroleum project, 204 wells are to be drilled by deploying these four charter-hired rigs.

The Cambay basin, stretching from Ankleshwar in the south to Mehsana in the north Gujarat, is one of the best explored basins in the country. The project, estimated to cost about Rs. 700 crores, has been granted World Bank aid to the extent of $242.5 million. The loan, which became effective on August 31, 1984, is to close on September 30, 1990.

The scope of work under the project includes seismic survey covering 1750 km in the Gulf of Cambay, exploratory drilling of four marametric wells, development drilling of 534 wells in north Gujarat, two enhanced oil recovery schemes and acquisition of field equipment, materials and consultancy training.

The drilling operation is the most expensive activity involving about two-thirds of the total expenditure incurred in oil exploration to exploitation.

The analysis of the behaviour of the operational expenditure indicates that around 60 per cent of the operational cost of drilling is directly proportional to the total drilling cycle time. This means that the cost incurred in the drilling operation can be controlled to a great extent by reducing the total drilling cycle time and by increasing the productivity of the rig.

Some of the specific initiatives taken by ONGC to improve drilling performance and cost reduction included dragging of rigs, modification of rig mast, leap frogging and rehabilitation of old rigs.

Dragging the rig from one location to another nearby location by necessary modifications and improvisation, in place of conventional ways of dismantling and transportation has brought substantial savings in time and money in the eastern region. As against the normal time of 35 days in rig building, it has now become possible to do the same job in about one week, thereby saving around 28 rig days.

The modification of rig mast of certian rigs has brought about a saving in time of 15 days in rig building operations. Taking an average cost of Rs. 54,000 daily for these rigs, the total saving on this account would work out to Rs. 8.1 lakhs per rig building operation. On an average three rig building operations are undertaken in a year indicating that the total saving per annum would work out to Rs. 24.25 lakhs.

In order to further cut down the time and bring about saving in drilling cost the concept of leap-frogging has been introduced. With the introduction of leap-frogging, time saving of around 20 days has been brought about in each rig building operaiion thus saving in rig days and bringing down the drilling cost.

Thirteen old and obsolete rigs which were laid off earlier were rehabilitated and put into operation during the Sixth Plan period. The performance of these rigs has been satisfactory.

HPCL REFINERY IN VIZAG CLOSED

The Visakhapatnam refinery of the Hindustan Petroleum Corporation (HPCL) had to be suddenly shut down, following fire in the water pumping station.

According to reports reaching the petroleum ministry, no casualty was reported. The fire, which started at 11 p.m. was put out at 3 a.m. on November 11.

The refinery was not damaged as the pumping station is about three kilometres away from it. The damage to the pumping station is likely to be rectified within a week. Experts from the safety directorate of the petroleum industry have rushed to the spot.

The HPCL chairman, Mr. M. K. Bagai, has sent refinery experts, including the director refineries from Bombay to ensure prompt recommissioning of the pumping station, which supplies salt water to the refinery for cooling purposes.

A team of marketing experts is also being sent to Visakhapatnam by HPCL to maintain flow of products from the refinery, which are already in stock. The HPCL is also seeking help of other oil companies to meet the demand for products in the region.

The petroleum ministry is keen that the 4.5 million tonnes refinery be put into operation expeditiously because of the vastly increased seasonal demand for petroleum products.

RUST DETECTING DEVICE DEVELOPED

Japanese scientists have successfully developed a portable instrument that is capable of monitoring the presence of rust in metals used in construction of bridges and other concrete structures.

Mr. Hiroshi Kihira of the Future and Frontier Research Laboratory, Japan, said the compact instrument had a pair of sensors and worked on an electrical circuit to detect the location of rust in the materials.

In a paper presented at the 10th international congress on metallic corrosion in Madras on November 10, Mr. Hiroshi said the instrument gave more accurate results than the contemporary method of visual observation done by technical experts.

The instrument could give the distribution of rust in long bridges at any desired spot or all along so that periodically its condition could be assessed and necessary corrective steps taken, he added.

SUPPLIES TO BRAND-NAME HOLDERS :

Small units may get back benefits

The Government is likely to amend notification 223/87 which resulted in the withdrawal of excise benefits from those small-scale units which are supplying their products to brand name holders. The notification, issued towards the end of September, took effect from October 1.

The rethinking on the notification has come about after protests by the apex organisation of the small-scale sector, the Federation of Associations of Small Industries of India (FASII), which incidently, had welcomed the move initially.

The FASII welcome to the move after its announcement was based on the conception that unfair competition prevailing in the small sector would end with the notification since a small section of the small sector was being patronised by the large units who purchased these products and marketed them on an all-India basis through their network. Moreover, this facility had also allowed some large units to deal in some of the products reserved exclusively for the small sector.

However, after careful scrutiny of the notification, FASII has come to realise that a large section of the small-scale sector would now lose excise benefits because the notification had a wider ambit than was envisaged. According to FASII officials, while it was demanded that finished products be covered by the notification, even components were now being covered under it.

Elaborating the point, FASII officials point out that the notification basically seeks to withdraw excise benefits from those products which are manufactured under the name of other companies with established brand names like Bajaj Electricals or Philips etc. However, as per the notification, even those units manufacturing stickers, for example, would be denied excise benefit although stickers necessarily would have to be in the name of the purchasing company. In this context, the case of units manufacturing Maruti or Ambassador name plates is citied by FASII.

Similarly, there are many units which manufacture components with brand names for others and these would also come under the notification. For instance, many TV manufacturers procure electrical sockets and plugs for their TV sets with the name of the company embossed on the plugs. Units manufacturing such plugs now stand to lose excise benefits, the FASII officials fear.

In its memorandum to the Government, FASII has also forwarded the case of shoe makers where the notification is likely to have an adverse effect on the weaker sections of society. According to FASII, most of the established shoe-making companies hand out job works to weaker sections of society for fashioning of shoe soles etc. In case the notification deprives excise benefits in such cases, an adverse effect is expected on the weaker sections, FASII has said.

According to FASII sources, these issues have been brought to the notice of the Finance Ministry and that it has been suggested that the notification take note of only finished products and leave out components from its purview. The Finance Ministry is understood to have taken up the matter for consideration new.

POOL PRICING FOR COPPER PLANNED

The Government is planning to introduce the pool price system for copper on the lines of the aluminium pool price. The proposal is understood to have been cleared by the Committee of Secretaries and is now being put up for Cabinet approval.

The decision to go in for pool pricing for copper has been taken against the background of soaring copper prices in the international market and the consequent financial burden on the domestic copper consuming industry. From November 1986, when imported copper was being distributed at Rs. 45,000 per tonne minus local duties, the selling price of the metal this month has gone up to Rs. 67,000 per tonne, an increase of nearly 50 per cent.

According to official sources the Committee of Secretaries has proposed that both imported and domestic copper be henceforth sold within a pool price band of Rs. 53,000 to Rs. 60,000 per tonne. At this price level, the domestic producer, Hindustan Copper Ltd (HCL) would also be making a profit since its cost of production has been estimated to be around Rs. 54,000 per tonne.

On the other hand, the difference between the imported price and the pool price would be made up by the Government from the 140 per cent import duty levied on the import of the metal.

Consequently, the domestic producer would also make a profit while the large copper consuming industry in the country would be assured of price stability for a considerable length of time.

It is expected that, barring some violent fluctuations in the international price, the pool price would be valid for one year at least.

While there has been a 50 per cent increase since last November, the Government was also concerned at the fluctuations in the London Metal Exchange prices which jumped from Rs. 40,000 per tonne (including duty) in November.

This fluctuation had caused considerable difficulty to the domestic consuming industry since it was unable to work out its cost of production and consequently could not quote for any long-term or even short-term supply.

One alternative before the Government was to reduce the high import duty of 140 per cent and provide some relief to the domestic consuming industry.

IMC SEEKS MODVAT STATUS QUO

The Indian Merchants Chamber has urged Union finance minister N. D. Tiwari, to rescind the Central excise notification no 190 of August 4, 1987 and to restore the **status quo** in respect of Modvat benefits to the small industrial units.

In a telegram to the minister, Mr. Nalin K. Vissanji, IMC president, has congratulated him for postponing the operation of the notification No. 190 till end of the current financial year.

He has stressed that the fiscal support given to the small units' products under the Modvat scheme has helped the industry to grow phenomenally in the past two years.

COMPANY NOTES

Hindustan Flurocarbons

Hindustan Flurocarbons Ltd. entered the capital market in February 1987 with a public issue of 39.6 lakh equity shares of Rs. 10 each.

The public issue was heavily over-subscribed and the company was allowed to retain upto 25 per cent of the issued capital from the excess of the over-subscription received by it. The company alloted 49.5 lakh equity shares (including the enhanced limit) aggregating Rs. 495 lakhs, to the public, the NRI, employees and business associates.

Hindustan Organic Chemicals Ltd., the holding company of Hindustan Flurocarbons Ltd. holds 40.6 lakh equity shares of Rs. 10 paid-up.

The Rs. 10 paid-up Hindustan Fluorocarbons shares have been listed on Hyderabad, Bombay, Delhi and Ahmedabad exchanges. The shares are actively traded and they command an appreciation of around 90 per cent now over the paid-up value.

The company commissioned the first section of its plant and successfully commenced trial production of CFM-22 in March 1987. The trial production of PTFE was started during the first week of July, 1987. According to the annual report for the year ended March 31, 1987, the company's products have been well-accepted in the market. Having set the project for commercial production, during the third quarter of 1987, Hindustan Fluorocarbons is expected to go into full stream before the end of the current year (March 1988).

The company has laid emphasis on marketing its product with necessary feed-back obtained from the holding company, Hindustan Organic Chemicals Ltd., Hindustan Fluorocarbons Ltd. has also been taking measures to determine the necessary product-mix so as to attain the targeted capacity utilisation in the first year of its operations.

The company has set up facilities for developing new uses for its products. Since the holding company has come forward to assist Hindustan Fluorocarbons for its marketing programmes, the latter does not envisage any major problems in marketing its products.

The Tata Economic Consultancy Services will carry out a detailed market survey of various grades of PTFE. Hindustan Organic Chemicals has also got in touch with a foreign company, namely, Flurocarbons Limited, UK, for obtaining the necessary technical know-how and services for further downstream applications of PTFE in India.

The gross block together with the capital work-in-progress, machinery equipment, materials etc. in transit and expenditure during construction aggregated Rs. 3,436.81 lakhs, as at the end of March 31, 1987.

The company has shown an amount of Rs. 285.7 lakhs as share application money pending allotment. This amount has been kept as bank balances.

The auditors' report has made some observations in regard to certain items in the accounts which the company has explained in the notes to the accounts. The company has to provide for compensation for the land, the title of which has not been yet transferred in favour of the company. No adjustments have been made for the excess land earmarked to Hindustan Organic Chemicals, the holding company.

No provision has also been made in the account for the reimbursement of sales tax to the contractors in respect of works executed. The company has an income-tax liability of Rs. 0.65 lakh for the year ended March 1986 and Rs. 0.04 lakh for the year ended March 1987 towards interest received/accrued on advance to contractors.

The company has also not stated the extent of outstanding balance to the debit or credit of the contracting parties.

The accounts for 1987 have shown an amount of Rs. 406.4 lakhs as current liabilities to Hindustan Organic Chemicals, the holding company. The notes to the accounts of the company state that out of this liability, Rs. 200 lakhs are to be adjusted against the allotment of 20 lakh equity shares of Rs. 10 each to the holding company, Hindustan Organic Chemicals Ltd.

Courtesy: 'Economic Times'

GUJARAT ALKALIES & CHEMICALS LTD.

Gujarat Alkalies and Chemicals Ltd. (GACL) has on hand two projects, involving a capital expenditure of Rs. 45 crores. The first project is for the manufacture of 16,500 tonnes of potassium hydroxide and 15,000 tonnes of potassium carbonate per annum. The cost of the project is estimated at Rs. 10 crores.

The second project is on ener- conservation, converting mer- y cells into membrane cells, ch is the latest technology in chemical industry. The cost the project is to the tune of 35 crores.

Besides, the company has de- ed to install a salt washery, ich will not only upgrade the ality of salt but also reduce purification costs.

eption

The company was incorporat- on March 29, 1973. It was omoted by Gujarat Industrial estment Corporation (GIIC) th an object to manufacture sic chemical products — cau- c soda, liquid chlorine and hy- ochloric acid. The promoter's uity stake is 40 per cent — Rs. 0 lakhs out of Rs. 425 lakhs.

ant sites and cost

The project is located at Baro- at a cost of Rs. 11.40 crores. e annual capacity was 37,425 nnes of caustic soda, 33,000 nnes of liquid chlorine and ,000 tonnes of hydrochloric id (100 per cent) per annum. e production started on Octo- r 19, 1976.

odium cyanide

For the first time in the coun- y, GACL took steps for the ma- ufacture of sodium cyanide. e foundation for the plant was id on April 25, 1981 and the roduction started in 1982. It egan the manufacture in the rm of egg-powders and granu- s. It has exported the first nsignment of 40 40 tonnes to ustralia where it has been used ainly in gold mines.

xisting capacity

The existing capacity of caus- c soda lye both licensed and in- talled is 1,03,425 tonnes, chlo- ne gas 91,500 tonnes and cya- ide salt 2,000 tonnes annually. he licensed capacity of liquid hlorine is 90,000 tonnes (installed capacity (49,500 tonnes) hydrochloric acid (100%) 48,000 tonnes (installed 36,000 tonnes), hydrogen gas 100 lakhs NM³ (installed 25 lakhs), and chloromethanes 16,500 tonnes (installed capacity 10,560 tonnes) annually. The installed capacity of caustic flakes is 16,500 tonnes per annum.

Production

The production of caustic soda lye during the year ended March 1987 was 96,000 tonnes against 89,325 tonnes, chlorine gas 85,056 tonnes against 79,142 tonnes, liquid chlorine 27,825 tonnes against 28,655 tonnes, hydrochloric acid (100%) 24,839 tonnes against 28,643 tonnes, hydrogen gas (compressed) 28.31 lakh NM^3 against 22.51 lakh NM^3, cyanide salt, 1,410 tonnes against 1,369 tonnes and chloromethanes 4,392 tonnes against 648 tonnes.

Outlook

Despite stiff competition, the company could have a capacity utilisation of 93 per cent in the case of the major product caustic soda during 1986-87. The capacity utilisation is much higher compared to the industry's average of 67 per cent. GACL has, however, to pay more on the power front till it is switching over to the latest membrane cell technology from the old mercury cell. Once the company adopts the latest technology there will be substantial saving on the power cost, enabling it to earn a good deal of profit on this account alone.

The company would have full year's benefit from the project for the manufacture of caustic soda concentration and flaking unit. The project was commissioned towards end of March 1987 and the product is well received in the market. Besides, it proposes to produce super dense variety of soda ash, caustic potash and potassium carbonate as insurance projects to meet with the fluctuating demands of caustic soda market.

It is also examining the feasibility of diversifying into the surfactant detergent line by setting up a unit of secondary alkane sulfonate. The new projects — soda ash and cold box, including second photochlorination unit are likely to be commissioned during the first quarter of 1988.

The company exports sodium cyanide and chloromethanes to Philippines, Taiwan, South Korea, West Germany, Japan and Russia. The long-term outlook will be brightened once all the new projects go on stream, including the captive power plant.

Courtesy : 'Financial Express'

GARWARE PLASTICS

Garware Plastics & Polyester, which did well during the year ended June, 1987 and stepped up the equity dividend to 22 per cent (20 per cent) has stated that the plant for the manufacture of polyester based video tapes has gone on stream in February, 1987 at Valuj, Aurangabad on schedule. The plant has now achieved a high level of efficiency both with regard to productivity as well as quality. This plant is claimed to be the first of its kind in India. To achieve economies of scale, the company is taking steps to instal a second line before the end of 1987-88. In order to cater to the needs of the end users, the company has also set up an ultra modern facility for recorded cassettes.

The first phase of modernisation programme in the polyester film plant was completed by the end of the financial year under review and the benefits of this programme will be felt through increase of exports of high value-added products in the current year. This will also strengthen the competitive position of the company in the export markets in Western Europe and USA.

MYSORE PETRO CHEMICALS

Mysore Petro Chemicals has stepped up the dividend by three points to 18 per cent for the year ended June 1987 in view of the satisfactory working results.

During the year, the company has earned a higher gross profit of Rs. 199.37 lakhs against Rs. 119.32 lakhs last year. Out of this, the provision has been made for depreciation of Rs. 152.90 lakhs against Rs. 27.65 lakhs, leaving a sum of Rs. 46.47 lakhs for appropriation. After adding surplus, the carried forward from the previous year is Rs. 0.54 lakh.

Provisions are : Taxation (Rs. 7.32 lakhs), investment allowance reserve (Rs. 0.90 lakh), general reserve (Rs. 10 lakhs), preference dividend (Rs. 3.80 lakhs), equity dividend (Rs. 24.82 lakhs) and surplus carried forward (Rs. 0.18 lakh).

Depreciation on energy saving devices was provided in the last year on straight line method. This year depreciation amounting to Rs. 121.83 lakhs has been provided fully to the extent of 100 per cent on the balance value of the energy saving devices.

The increase in profitability was achieved with higher unit sales realisation and economies in the costs, although the volume of production and volume of sales were lower than those of last year on account of plant shut down for 45 days for change of catalysts and erection of high pressure turbine, low pressure turbine and switch condensor.

During the current year, the directors feel that the company would be able to achieve improved working results after commissioning of high pressure turbine and the new switch condensor.

KOTHARI INDUSTRIAL

Kothari Industrial Corporation Limited has skipped the dividend for the year ended June 30, 1987 following a post-depreciation loss of Rs. 375.88 lakhs against a loss of Rs. 276.74 lakhs in the previous year.

The turnover was satisfactory at Rs. 7266.86 lakhs (Rs. 7253.89 lakhs) but the profitability of the company was seriously affected by the drought. The turnover of the plantations division was lower. The directors report that the outlook for the current year was good because of favourable monsoon.

The fertilizer division did well with both production and sales of superphosphate and sulphuric acid registering an increase. By installing additional machinery, the company has increased the capacity of the division to 66,000 tonnes of super phosphate and 33,000 tonnes of sulphuric acid per annum.

The textile division also did well particularly on the export front. The capacity utilisation of the mills at Coimbatore was 95 per cent but in the case of the mills at Adoni it was only 82 per cent because of severe power cut. The company proposes to implement a technological upgradation scheme to enable production of high quality yarn for doméstic as well as export market. The profitability of the textiles division is expected to improve following the closure of the uneconomical loomshed at Coimbatore.

POLYPLEX CORPORATION

Polyplex Corporation is settir up a plant for the manufactu of 4000 tonnes per annum of p lyester film at Khatima, in Nair tal district of U.P. The comp ny has been promoted by M Sanjiv Saraf, a technocrat indu trialist, and his associates. Th project is being implemented i technical collaboration with Lir dauer Dornier GmbH, West Ge many.

The financial institutions hav assessed the project cost at Rs 27.10 crores which includes Rs 4.88 crores of equity to be offe ed to public subscription throug prospectus. The issue is plar ned for December 1987.

The company has made sub stantial progress in the imple mentation of its project. The ci vil works are already complete The main plant is at the final sta ge of erection. The compan will commence trial runs by De cember and commercial produc tion soon thereafter.

BHOR INDUSTRIES

Bhor Industries, set up in 194 to manufacture leather cloth an proofing of paper, has launche a new company 'Bhor Waveloc Industries Ltd.' to manufactur nylon reinforced with plastics — a product range of high tensil strength, light weight and water proof materials.

The plant was supplied b Japan, according to the promot ers of the company.

To part finance the project the new company would ente the capital market shortly.

RCF PLAN TO RAISE RS. 750 CRORES

Rashtriya Chemicals and Fer tilisers Limited (RCF) plans t generate gross internal resource of Rs. 750 crores in the Sevent

m to be utilised for revamping
l modernisation of old plants
l in new ventures like manu-
ture of TV glass, shell and
o-chemical paper.

he company has declared di-
end for the ninth consecutive
r. The dividend for 1986-87
ounted to Rs. 11.03 crores
ntained the level of the pre-
us year.

Minister of state for fertilisers
Prabhu received the dividend
que from Mr. Duleep Singh,
irman and managing direc-
of RCF.

Presenting the cheque, the ma-
ging director told the minister
t RCF's operating performan-
during 1986-87 attained a new
h by producing more than 2
lion tonnes of fertilisers with
ales turnover of about Rs. 700
res. Company's gross profit
ched a new figure of Rs. 195
res during the year and some
the plants attained a hundred
cent capacity utilisation dur-
1986-87.

The managing director also
ormed the minister that RCF has generated internal resources of about Rs. 450 crores which have been utilised for expansion of capacity and modernisation, including the super fertiliser project at Thal. RCF has also created a reserve of Rs. 155 crores.

TATA CHEMICALS

Tata Chemicals has, for the first time, announced an interim dividend of 10 per cent for the year ending March, 1987. Net sales at Rs. 96.56 crores for the six months ended September, 1987, against Rs. 80.88 crores in the same period last year are up by about 22 per cent and the gross profit at Rs. 22.70 crores (Rs. 18.75 crores) is up by about 21 per cent. After providing Rs. 8.26 crores (Rs. 6.66 crores) for depreciation and Rs. 2.12 crores (Rs. 2.19 crores) for taxation, there is a net profit of Rs. 12.32 crores against Rs. 9.90 crores in the first six months last year.

Soda ash production increased by 9.1 per cent to 298,434 tonnes and sales increased by 13.2 per cent to 262,389 tonnes. Production and sale of other important products also showed healthy trends. These record results were achieved in the face of the severest drought conditions.

The proposed interim dividend will ensure some return, during the current financial year on the shares alloted from April 1, 1987, consequent upon the compulsory and automatic conversion of Rs. 40 — portion of the convertible debentures.

GLINDIA OUTLOOK

Glindia, which proposes to increase its licensed capacities for formulations, has reported satisfactory progress with regard to the establishment of manufacturing facilities for three new bulk drugs viz. ranitidine, cephalexin and griseofulvin, and the first of these will be commissioned in the coming year.

The company continues to receive technical guidance from Glaxo, UK, for these three projects. The joint venture projects with the Karnataka and U.P. state governments are progressing satisfactorily.

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Highlights in Chemical Technology (Part 2)

FLUIDIZED-BED TECHNOLOGY TO CONVERT GARBAGE TO ELECTRICITY DEVELOPED BY ENVIRONMENT PROTECTION RESOURCES INC. USA

A fluidized-bed technology to convert garbage to electricity more efficiently and cleaner than existing fixed-bed, mass-burning facilities, according to Environment Protection Resources Inc. (EPR, Houston, Tex).EPR will build a plant in Texas City, Tex. that has capacity to burn 156,000 ton/year of garbage. Slated to begin operation next year, the $28.5 million unit will generate 11 MW of electricity, and recycle aluminium and ferrous materials for sale. Some 5% of the feed will be converted to ash and then landfilled. It is reported to be the USA's first such commercial installation.

Key to the unit is a front end separation system developed by National Recovery Technologies (Nashville, Tenn). This first removes ferrous materials and most of the aluminium. The remaining paper, plastic and other materials are shredded to 1-inch and 2-inch particles and fed to the incinerator where they burn at 1800°F. This is said to be hot enough to destroy virtually any dioxins, while cool enough to avoid generation of undesirable nitrogen oxides.

Mass-burning facilities that do not shred material and separate metals cannot use fluidized beds because the particles are too large, reports EPR. They also must maintain temperatures 400°F higher than fluidized beds. (*Chem. Eng.* 8/17/87 p. 17).

WORLD'S FIRST SOLVENT EXTRACTION JOJOBA OIL PLANT INAUGURATED IN MEXICO

The world's first facility to use solvents to extract oil from jojoba is now on-stream reports operator/owner Desert King Corp. (Chula Vista, Calif., USA). Located in Mexico, near Tijuana, the unit will produce up to 35,000 lb/day of oil from 70,000 lb/day of the desert shrub's seed when it goes into three shift production in September 1987.

Harvesting began only recently, and the process is now operating on one shift. Solvent extraction recovers more than 99% of the total oil content, compared with only 80% for the conventiional expeller-pressing method, reports William Watson, Vice-President of Desert King. The firm starts with conventional pressing, then percolates hexane through the cake to extract remaining oil. Hexane is driven off and recovered for re-use by heating the colloidal product to about 90°C. Watson reports that solvent extraction has not previously been used for jojoba because production volume could not justify it. (*Chem. Eng.* 8/17/87 p. 19).

A NEW PROMISING STARCH PROCESS FOR PAPER INDUSTRY UNVEILED IN WEST GERMANY

A new starch process promises big rewards to paper producers. West Germany's Degussa AG (Frankfurt) has developed a catalytic route for the dry phase cationization of starch. In paper making, starch is positively charged to improve its adherence to the cellulose fibres, which are negatively charged.

Advantages of the new process compared with existing aqueous-dispersion methods: higher yields of cationized starch (90-93% for potato starch, compared with 70-80% for dispersion processes); 50% lower investment; and no effluent starch produced with the method is said to be comparable in quality, and in some cases superior to conventional cationized starches, reports Degussa.

In the process, an inorganic solid catalyst (10% by weight) is mixed with a reagent -- an epoxide compound -- and added to dry starch. The reagent chemically bonds to the starch, giving it a cationic charge. The firm's Industrial and Fine Chemicals Division will license the process, and sell the apparatus and materials. (*Chem. Eng.* 8/17/87 p. 18).

EUROPEAN, AMERICAN & JAPANESE COMBINE POOL EXP JOINT VENTURE TO PRODUCE URETHANES WITHOUT PHOSGENE

An international joint venture of three companies from three continents will pool their know-how to try to develope a non-phosgene route to produce methylene diphenyl isocyanate, an important precursor to urethanes. Catalytica (Mountain View, California), Halder Topsoe (Copenhagen, Denmark) and Nippon Kokkan (NKK), the Japanese steel producer, each has filed patents on aspects of the undisclosed process.

atalytica and Topsoe have backround in carbonylation and C_1 hemistry. N.K.K. (Japan) has eveloped a pressure-swing adsorpon process to recover high purity arbon monoxide. (*Chem. Wk.* /29/87 p. 32).

XTRACTION OF BOTANICALS SING LIQUID CARBON DIOXIDE A NEW LANDMARK IN FOOD LAVOURS & COSMETICS NDUSTRY

The quest for a complete replicaon of nature by extraction of botanals without damaging or degarding e extract has become recently ommercial reality with the coming f liquid carbon dioxide extraction echnology in 1981. This has been chieved by extracting the botanials at sub-ambient temperatures ith liquefied carbon dioxide a natral solvent.

During the conventional steam istillation or solvent extraction of otanical material, some degradaon of important components ccurs. This damage is caused by e use of heat and steam or water apour and is irreversible. Degradaon of some of the sequiterpene omponents of essential oil to form onoterpene hydrocarbons is ommon and is documented in literture. (*Chem. & Ind. (London)* **7**, 71, (1975)).

The loss of volatile top note romas during steam distillation is lmost inevitable at 100°C due to olatilisation and solubility in the ohabation waters.

Steam distillation will extract oio omponents of the botanical with olecular weights up to 200-250. iquefied carbon dioxide by contrast, xtracts molecular weights up to 400 t low temperatures. At high presures of between 8 and 80 times tmospheric pressure and temperature below 10 degree C. carbon dioxide liquefies to become a non-polar, selective solvent, which is odourless, tasteless, colourless, easily removed and non-flammable. In fact, the ideal safe solvent for extraction of botanicals, including essential oils. This liquid carbon dioxide processing has been described in the Chemistry & Industry Journal (*Chem. & Ind. London,* **12.** 402, (1982)) by S.J. Garaner. It is a capital intensive high cost technology involving high pressure stainless steel extraction.

The choice and preparation of raw botanical is important to maintain extract quality. During grinding of the botanical, carbon dioxide solid and gas are added to keep the finely divided material cool and blanketed to prevent oxidation.

Liquid carbon dioxide selectively extracts the essential oil plus the higher fractions of the resins imparting the character of an 'absolute' to the extract. It rejects proteins, waxes, sugars, chlorophyll and pigments to yield an extract which more closely resembles the aroma and taste of the botanical starting material than does the steam distilled equivalent.

The advantage of carbon dioxide extracts compared to conventional oils prepared from the same batch of botanical starting material are:

- No solvent residue
- No off notes generated during distillation
- More top note, because of low temperature extraction
- More back note, because carbon dioxide extracts the character of the absolute
- Better solubility, because no terpenes are generated during extraction.

Fundamentally, all dry botanicals with an oil content are extractable with carbon dioxide. A wide range of essential oils extracted at low temperature have been commercially available in affluent countries of the Europe and America for use in high-priced cosmetics and perfumeries in the last 4 years or so. The superior properties of these essential oils over conventional products can be ganged by the product advantages and application areas described below for ginger oil:

Two ginger oils prepared from the same batch of ginger root Nigerian were analysed by GLC (*Analyst London* **109,** 1339-41; *ibid,* **109,** 1343-60). The ginger oil extracted with carbon dioxide as solvent represents the molecular weight fraction between 200 and 400, which is brown in colour and has the pungency and character of absolute of ginger. These components are the gingerols, shogaols and zingerines. Extra topnotes can also be found and the mono-terpene hydrocarbon level is 10% by CO_2 extract and 30% by steam distillation of the same sack of ginger root. When the CO_2 extract is steam distilled in the laboratory, it gives colourless oil with the same profile as oil steam distilled from the root. The CO_2 extract, therefore is a superior extract of ginger with the true taste and aroma of prime root as it occurs in nature.

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thesize the pigment ultramarine blue that avoids the generation of high levels of pollutants characteristic of existing production processes.

Research Scientist Rosemarie Szostak of Georgia Tech's Energy Materials Sciences Laboratory has produced the pigment by impregnating the pores of a white zeolite material with sulfur. Synthesise takes place relatively quickly, at low temperatures, reducing energy costs as well as unwanted sulfur by products. The material requires less additional processing time than any synthetic material made to date.

Georgia is now patenting the technology and attempting to license it to a large company which will find work to refine the process. Ultramarine blue which is not now manufactured commercially in the USA, is used in paints, cosmetics, inks, rubber, plastics, oil and soaps and as an agent to whiten paints, paper, pulp and plastics. (*Chem. Wk.* 9/9/87 p. 21).

A NEW GAS DEW-POINT MONITOR FOR ON-LINE ANALYSIS OF NATURAL GAS COMMERCIALISED IN BRITAIN

A new gas dew-point monitor for on-line analysis of natural gas has been commercialised in Britain. The instrument -- invented by Shell Research Ltd.'s Thornton UK Research Centre -- will be made and sold worldwide under exclusive license by Michell Instruments (Cambridge, UK), which helped to develop the device.

Dew point measurement in natural gas is complicated because the various liquid hydrocarbons contained in it condense at different temperatures resulting in an indistinct dew point. The Thornton monitor uses the reduction of intensity of scattered light from a fibre-optic system to track changes in gas quality with reliability that Shell reports 'cannot be matched by visual optical methods' now in use.

The instrument also may be used for humidity monitoring in industrial plants under arduous conditions. The device is expected to be priced at $25,000-38,000 range and will be in the UK market by the end of 1987 (*Chem. Wk. 3/18/87 p. 25).*

A NEW NON-PHOSGENE BASED PROCESS FOR METHYLENE DIPHENYL ISOCYANATE ON THE HORIZON

Nippon Kokkan has developed a new process for methylene diphenyl isocyanate (MDI). MDI is a raw material for polyurethane resin. The new process is non-phosgene process compared to the conventional process employing several complex steps. The new process is expected to achieve a cost reduction because MDI is obtained from direct reaction of carbon monoxide based on C_1 chemistry. The new process is also reported to give 10% higher yield with the following advantages: (a) It features compact facilities; (b) no corrosion effect, because chlorine is not employed; (c) it has higher cost competitiveness than the conventional processes employing nitrobenzene, aniline and phosgene.

However, the new route involves some challenging problems, including isomer generation in production. (*CEER*, Vol. 10, No. 1-2-3, p. 49).

FOOD CHEMICALS PRESENT OPPORTUNITIES FOR GROWTH TO CHEMICALS & BIOTECH INDUSTRIES

Food production industry (i.e. food technology) is undergoing dramatic shifts in production technologies is a result of consumer trends, greater health consciousness, breakthroughs in new product developments and rapidly expanding biotechnological capabilities.

Recently 'Chem Systems' has published a thought provoking study under title 'Chemicals for the Food Industry', 'Selected Techno-Economic Assessment'. This study is an in-depth analysis of the technology and economics of production of selected chemicals important to the food processing industry.

Significant chemicals used for the food industry, include alternative sweeteners such as aspartame, acidulants such as malic, lactic and citric acids, fats such as cocoa butter and potential fat substitutes such as the sucrose polyesters.

In general, the food chemical market is mature, its growth paralleling population trends. However, there are selected areas of high growth, particularly in health-conscious effluent countries e.g. alternative sweeteners and the potential fat substitutes.

The Chem System's study covers in detail the following 10 groups of chemicals, with particular interest bearing on food technology:

* **Phenylalanine** -- This is the key component of artificial sweetener aspartame. Chem System's study examines the three alternative technologies for its production: (a) the cinnamic acid base route (which suffers from the disadvantage of high capital cost, (b) fermentation route (currently in practice) and (c) the transamination route (based on biscarbonylation and enzymatic technology). Costs of production range in the $8-10/lb range -- a cost for too high for mass consumption in the poor third world countries.

* **Acesulfama K** -- This artificial sweetener, developed by Hoechst is

00-times as sweet as sucrose and f the same order of sweetness as spartame. The synthesis of this naterial is based on the condensa- on of t-butyl acetoacetae with hal- esulfonyl isocyanate. The cost of roduction for this material ($2.00/lb) s below that of saccharin, with which cesulfame-K has been compared.

High fructose corn syrup HFCS) -- This product is examined rom the perspective of its immobil- ation technology.

Sorbitol -- Process for this sugar ubstitute involving the hydrogena- on of glucose are critically analysed rom a techno economic perspec- ve. New technology is emerging for s continuous production. The cur- ent batchwise process in the near uture will be replaced by a contin- ous production process.

Citric Acid -- Used as an acidu- ant in a number of foods and beverages. Conventional production involves traditional fermentation and recovery operations. An analysis of Miles Laboratories 'Liquid ion-exchange' (LIX) recovery technology shows that the LIX technology could save on capital and utility costs but has higher raw material costs.

* **Malic acid** --This is relatively recently introduced food acidulant particularly popular in beverages in view of its unique fruity sour taste. It is especially getting popular in USA. It should not be confused with maleic acid -- a highly toxic acid.

* **Lactic acid** -- Another acidulant used for food at the level of 10,000 tonnes/year in the USA. It is currently made in bulk via HCN and acetaldehyde interaction. Recent developments in immobilization technology imply that significant reductions in costs can be achieved using microbial hollow fibre techniques. Such high productivity and high yield biological process could lead to costs of production as low as 60 cents/lb.

* **D-Alamine** -- A key constituent of Pfizer's artifical sweetener Alitame currently seeking FDA approval. Economic manufacturing technologies are under development.

* **Potential New Fat Substitutes** --P & G's technology for the manufacture of sucrose polyesters is expected to yield a production cost of around $1/lb.

* **Cocoa butter** -- This product can be made via lipase catalyzed reactions of palm oil and stearic acid. Such a biotech process could produce in future this butter at approximately 70 cents/lb.

Chem Systems' study discusses in detail the technology and economics of the above processes for food processing chemicals (*CEER*, Vol. 19, No.1-2-3, p. 44).

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An Overview of the Paint Industry

S. SUBBERWAL
President, Indian Paint Association, Calcutta

andscape of the Paint Industry

An industry is said to operate in a mature market if s unit volume is growing at a rate less than GNP, if over apacity is occurred, if products are being underpriced, there are too many competitors and if the productivity becoming increasingly difficult to justify investment for ew labour saving capital projects, if industry margins nd returns are declining. The paint industry can espond affirmatively to most of the statements. The ndustry, therefore, has multiferious problems. The paint ndustry is an intermediate goods industry and therefore s growth depends on the growth of other industries.

If we examine the frequency distribution of capacity tilisation rates of the paint industry, we will find that the aint industry has been grouped with industries which tilised their capacities at lower level during the year than ast year.

FREQUENCY DISTRIBUTION OF CAPACITY UTILISATION RATIO OF PAINT INDUSTRY

ange of capacity utilisation 1985-86	Capacity Utilisation Ratio (Percentage) 1985-86	1984-85	1983-84	Percentage Variation 1985-86 over 1984-85	1984-85 over 1983-84
Above 80	82.7	90.8	78.0	-8.9	+16.4

The lower capacity utilisation can be ascribed to high cost of raw materials and high build-up of capacity in relation to demand, slackness in demand following steep competition.

The over rate of growth in the economy projected for he Seventh Plan period envisages a significant acceleration in the growth of industry and infrastructure. Accordingly Government has fixed up sector-wise targets of growth. Government has expected that manufacturing sector is expected to increase at an annual average rate of 8%. With this aim in view, the Government has announced a number of measures liberalising the industrial policy and streamlining the investment procedures to remove the constraints of production, increase capacity utilisation and productivity, reduce costs for obtaining economies of scale and improve the quality of product. The growth during 1985-86 has to be viewed in the background of the development strategy and the industrial policy outlined for the Seventh Plan.

This is the landscape of the paint industry.

Anticipated capacity

Present installed capacity of the paint industry in the organised sector of is 1.6 lakh tonnes. Taking into account the letters of intent/registrations issued which may lead to an additional capacity of 70,000 tonnes, total capacity likely to be installed by 1989-90 (or earlier) may be placed at 2.3 lakh tonnes. The estimated demand of 1.8 lakh tonnes for the organised sector would therefore imply a higher capacity utilisation compared with the present utilisation rate. As for the unorganised sector, it is difficult to project the growth of capacity as the adequate information is not available.

Demand Estimation

It may be noted that estimates II and III in Table-1 imply a rise in per capita consumption of 0.3 kg of paints at present to 0.4 kg of paints by 1989-90. While these levels would still be far below the per capita consumption levels of 15 kgs to 25 kgs, it may not be possible even to reach these levels within five years. A per capita consumption level of 0.40 kg may be achieved by 1989-90 if adequate promotional efforts are undertaken.

This would imply a total demand of around 3.2 lakh tonnes of which approximately about 1.8 lakh tonnes could be the market for the organised sector and the rest for the unorganised sector.

Demand-Supply Balance

To meet the projected demand of about 3.2 lakh tonnes in 1989-90, the industry would require a total capacity of 4.3 lakh tonnes at capacity utilisation rate of 75%. As against this, the total capacity in the industry is currently estimated at 3.85 lakh tonnes. This would imply an additional capacity requirement of 0.45 lakh tonnes while the capacity in the pipeline in the organised sector alone is 0.70 lakh tonnes (Table-2). It is quite possible that the unorganised sector may operate

Table-1
ALTERNATIVE DEMAND ESTIMATES FOR PAINTS, 1989-90
(Lakh tonnes)

Alternative Demand Estimate	Organised Sector	Unorganised Sector	Total
I. Past overall domestic consumption growth rate of 4.9% p.a.	-	-	2.95
II. Expected growth rate of 8%	-	-	3.51
III. Expected growth rate of 11%	-	-	4.13
IV. Past growth rate of domestic consumption and exports for organised sector	1.41	-	-
V. Trend equation for domstic consumption for organised sector and past growth rate of exports	1.22	-	-
VI.- Seventh Plan Projection	1.63	-	-
VII. Constancy of per capita paint consumption (0.3 kg)	-	-	2.57

much below 75% capacity utilisation allowing greater market expansion opportunities for the organised sector. However, the major part of the market for unorganised sector may not be available to the organised sector units which basically cater to localised and specific quality demand.

Table-2
DEMAND-SUPPLY BALANCE, 1989-90
(Lakh tonnes)

1.	Estimated Demand in 1989-90	3.20
2.	Capacity required in 1989-90	4.30
3.	Present capacity in the organised sector	1.60
4.	Present capacity in the unorganised sector	2.25
5.	Total available capacity at present (3+4)	3.85
6.	Additional capacity required	0.45
7.	Capacity in the pipeline in organised sector	0.70

Demand Projections: 1989-90

Domestic consumption of paints and varnishes increased at an annual rate of 4.9% during 1970-71 to 1983-84 -- from 1.07 lakh tonnes to an estimated 2.0 lakh tonnes. At this rate, domestic demand for pain would increase to 2.79 lakh tonnes by 1989-90. Agai going by the per capita consumption basis, at prese only around 0.3 kg (against 25 kgs. in USA, 21 kgs. i FRG, 19 kgs. in Sweden, 16 kgs., in France and 15 kg in U.K.), domestic demand level in 1989-90 works ou to 2.41 lakh tonnes for a population size of 803 millio by the terminal year of the Seventh Plan, even assuming no further rise in per capita paints consumption leve

As for the export market, growth rate observed in th past 14 years is 4.2% p.a. At this rate, export deman for Indian paints and varnishes is projected at 16,00 tonnes (approximately) for 1989-90. Total deman (domestic consumption plus exports) for paints and varnishes by 1989-90 may thus be estimated in the rang of 2.57 - 2.95 lakh tonnes.

Since paints and varnishes produced in the smal scale sector and organised sector are of different qualities and are meant generally for different market segments (barring some overlapping market slots), the rat of growth in demand for these two sectors could be different. An indepth analysis of different types of paint for different market segments would call for examinin the trends in respect of a large number of explanator variables including income in different size ranges expenditure on building construction and maintenanc in household and industrial sectors (large and small separately), etc.

If the domestic consumption of the organised secto products is considered, the annual growth rate works out to 4% during 1970-71 to 1983-84. At this rate domestic demand on the organised sector of the paints industry would be 1.25 lakh tonnes in 1989-90. However, on the basis of regression equation fitted to the time series data for the same 14-year period, domesti consumption in 1989-90 for the organised sector is projected at 1.06 lakh tonnes (implies a 3% p.a. growth rate). With the projected exports figure of 0.16 lakh tonnes,total likely demand for organised sector's produce in 1989-90 is estimated in the range of 1.22 - 1.41 lakh tonnes. It may be mentioned here that the official forecast of demand for paints and varnishes for the organised sector by 1989-90 is 1.63 lakh tonnes. All these mean that the demand on the unorganised sector in 1989-90 could range from 0.94 lakh tonnes to 1.73 lakh tonnes.

It is generally believed in the industry circle that with the growth automobile market and expected increase in the level of industrial activity as a result of liberal policy

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		(i) Defatted	31 MT.
		(ii) Full Fatted	163 MT.
3.	MMD-3/SO/87	Soyabean Oil (Refined)	792 MT.
4.	MMD-2/GNO/87	Ground Nut Oil	705 MT.
5.	MMD-2/CSL/87	Corn Steep Liquor	515 MT.
6.	MMD-2/Glu/87	Glucose	518 MT.
7.	MMD-2/Hyd/87	Hydrol	437 MT.
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However the tender documents may also be obtained in person from our Chief Cashier upto one day before the date of opening of respective tenders.

Tenders from distributors or agents should accompany letter of authority from the manufacturer.

Tender for each item must be sent in separate envelope duly sealed and marked Tender Enquiry No. & Date of Opening.

Tenders will be received up to 2.30 P.M. and opened at 3.00 P.M. on the following dates:

For item at Sl. No. 1 to 4	.. .. 14.12.1987
For item at Sl. No. 5 to 9	.. .. 16.12.1987

Sr. Materials Manager

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measures, the paints and varnishes industry is likely to witness a higher rate of growth in demand than has been observed in the past. The growing urbanisation also would help in generating higher demand level. The paint manufacturers are also gearing up to meet the country's requirements of sophisticated/high technology coatings during the coming years. The industry circle thus expects the market for paints and varnishes to grow at 8% p.a. (the growth rate targeted in the Seventh Plan for the whole industry sector). At this rate the demand potential by 1989-90 would be 3.51 lakh tonnes. The more optimistic expectation is a growth rate of 11% p.e. -- the rate observed during the recent few years. The market size for paints and varnishes in 1989-90 at this rate would be 4.13 lakh tonnes (Table-1).

Emerging Trend in Surface Coating Technology

Operating in a dynamic environment we are constantly facing with changing situations. An axiom for a management of a business in a changing situation could well be "If you continue to do business in the same manner with the same programmes and the same people for an extended period of time, failure is inevitable." Equally hazardous, however, is the temptation to initiate change for the sake of change as a means of breaking out of the slow-growth syndrome. The process of change, therefore, leads to a continuous demand for new products. The demand on our industry for newer and better coatings will come from a number of areas. Let us examine some of the major ones:

Energy:

Man's command on use of steam started the industrial revolution. Later, in a large measure, oil took over from steam. A totally new era evolved with a string of products and services that allowed mankind to enjoy a better living.

However, the dimension of cost and availability of oil underwent phenomenal changes and have now reached a stage where compulsion for conservation is binding. Whereever coatings are cured by use of energy, new qualities have to be developed for low-energy cure. Also, systems have to be improved with new qualities to avoid multiple curing. High-solids, powder coatings, radiation curing paints are the pace-setters in this direction. Solid contents of paints -- particularly industrial finishes, have been rising. Contributing to this rising average has been the growth popularity of all solid powder coatings.

Ecology:

Talks on environment are no more a fashionable pastime. Reckless disregard has already brought about serious imbalances in many parts of the globe and allowed to go unchecked, it will, doubtless, lead to a disastrous situation.

In so far as our industry is concerned, efforts mus continue at an accelerated pace of eliminating/reducin use of solvents. Here again, water-based coatings an powder coatings are significant achievements but thes are restricted to industrial usage largely. Something ha to happen in air-drying system which accounts for th major portion of our industry.

Water continues to gain favour as a paint career. I the architect paint sector in the developed countries 70% of sales are water thinned coatings. Industry ha been a bit slower to adopt them.

The penetration of water-based products is higher fo interior paints which accounts for 55% of architectura sales. This class of products has reached 80% penetration level in the State. Water-based interior paints ar available in the full range of products from primers t flat wall paints, egg shell, semi-gloss and gloss enamels

Lifestyle:

Unlike energy and ecology, the relevance of lifestyl influencing the emergence of newer coatings is not s widely and fully understood. With rapid urbanisation nuclear family, working mothers, people's lifestyle i undergoing a sea change. In the field of common decorative paints the conventional products with its attendant ills of time, odour and the overall mess, are no going to be favoured by tomorrow's consumers in thei new surroundings. The industry will surely face th demand of developing the new products that would cu down the total painting time, remove the hazards o smell, prolonged wet paint film, etc.

Water-based paints have just set the trend but sti have a long way to go in providing the desired standards for gloss and abrasion resistance that are essential for household paints.

Tomorrow's consumers may well expect a one-coa finish for their homes. Industry will do well to engag attention in initiating activity in this direction.

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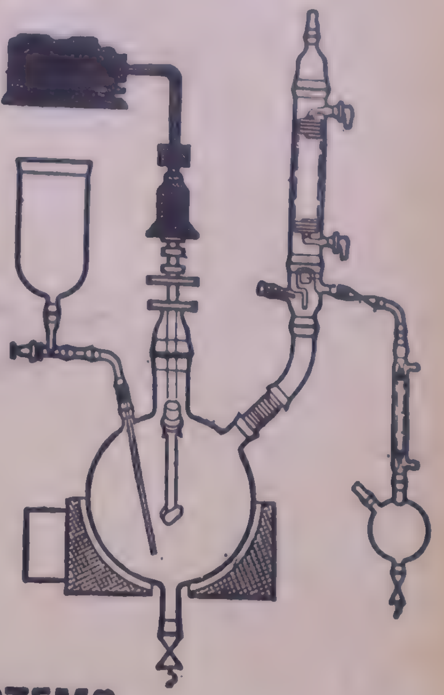

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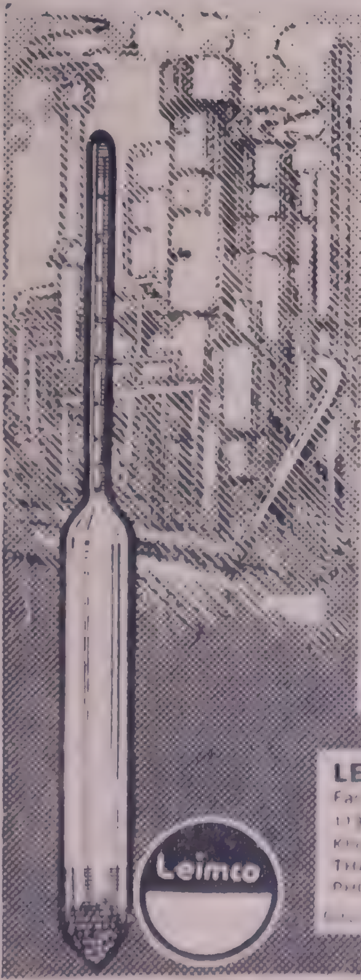

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Chemical News from Abroad

SHELL STUDIES NEW PP UNIT AT CARRINGTON

Shell, the world's second largest producer of polypropylene, is studying the feasibility of building a new PP plant at Carrington, the site of Shell's only UK 10,000 ton/year PP facility.

John Collins, managing director of Shell Chemicals UK recently said that his company plans to build two PP units by the year 2010. The first facility could clearly be on stream well ahead of that date.

"We are looking to expand at Carrington where we have an existing plant," said Brian Holmes, manager of public affairs at Shell Chemicals UK. Polypropylene, he affirmed, has a priority in Shell's investment strategy. Shell has an 11 per cent world market share in PP and is number two after Himont.

Shell has just announced a £90m ($148m) investment at Stanlow as part of its long-term plans in polypropylene. The investment includes a gas separation complex, propane/propylene splitter and associated facilities to replace Stanlow's existing gas plant. Construction is due to begin in January 1988 for completion in mid 1989. The timing of the extra propylene suggests that the PP unit could be on stream by that date.

Using feedstock from a £190m catalytic cracker, now nearing completion at Stanlow, the new plant there will produce fuel gas, liquid petroleum gas and other products. Propylene will be separated out by the propane/propylene splitter and transported through the existing pipeline to Carrington for conversion to PP.

"We have reached a milestone in securing feedstock for what is likely to be a new plant," Holmes said.

Capacity figures for the PP unit have not been disclosed but it would be uneconomic to build a plant of less than 100,000 ton/year capacity. The cost, which partly depends on infrastructure at the site, could be in the region of $70-$100m.

The UK investment is the latest in a line of new PP projects at Shell. The company, whose total involvement in production (some plants are joint ventures) is put at 1.2m ton/year, has announced plans for a grassroots 120,000 ton/year PP plant at Wesselling, near its ROW joint venture with BASF.

Its French subsidiary, Shell Chimie, is studying the possibility of building a 100,000 ton/year PP plant at Berre in the south of France, according to Pierre-Yves Masson, the company's president, and Shell Nederland Chemie, which has recently debottlenecked its Pernis PP plant to 90,000 ton/year, has begun preparations for further expansion of capacity to 135,000 ton/year by 1989.

Shell's PP capacities are as follows: Berre, France 110,000 ton/year; Carrington, UK 110,000 ton/year; Clyde, Australia 30,000 ton/year; Geelong, Australia 40,000 ton/year; Kashima Japan 120,000 ton/year; Maua, Brazil 90,000 ton/year; Norco, US, 135,000 ton/year, Pernis. The Netherlands 90,000 tons/year; Sarnia, Canada 80,000 ton/year; Seadrift, US 80,000 ton/year; Wesseling West Germany 150,000 ton/year; Woodbury, US 147,000 ton/year; and Yokkaichi, Japan 70,000 ton/year. Some of these units, notably ROW are joint ventures.

ICI, the only other UK producer of PP has also embarked on a programme to increase capacity. It is adding a total of 110,000 ton/year to its plants at Wilton (currently 200,000 ton/year) and Rozenburg (100,000 ton/year.

DSM, KOPPER, ACQUIRE ICI RESINS

A New Joint venture company between DSM Resins, a division of DSM of the Netherlands and Koppers of Pittsburgh, US has acquired a thermoset resins business from ICI Speciality Chemicals' subsidiary, Atlas Europol SpA.

As from October 1, 1987 the new joint venture will operate under the name of Atlac Resins Sal, based at Filago, Italy. ICI will retain manufacturing facilities there and produce the thermoset resins from the new venture until 1990, when Atlac will start operating its own facility.

The business acquired by Atlac Resins covers Europe, Africa and the Middle East. Some 4,000 ton/year of resins are produced and the business has a turnover of some £7m ($11.5m).

The products are used in the industrial polyester business, with a product range including bisphenolic and vinyl ester resins for corrosion protection in industrial processing plants and pipes as well as binders for reinforcement purposes. The deal excludes Atlac's Europol's toner resins.

Last December Koppers acquired the US Atlac resins business of ICI Speciality Chemicals, for a figure believed to be equivalent to Atlac's US and Canadian sales of $15-20m. ICI says the divestment forms part of its reshaping towards higher value added products.

Koppers is the fourth largest US producer of unsaturated polyesters.

CDF CHIMIE IN TALKS TO SELL DUCO PAINTS

CdF Chimie is negotiating with Sweden's Casco Nobel for the sale of its paints subsidiary Societe Francaise Duco, which produces paints for the mechanical and automobile industries. The French company has been in the red for some time because of the slump in this sector of industry in recent years.

Business is said to be picking up but there is stiff competition in the area, notably from ICI. The move is in line with CdF Chimie's restructuring policy. In paints, it is refocusing on consumer products (Ripolin and Avi lines), building (Guittet and Ripolin), and anti-corrosion (Freitag) markets, all of which it intends to develop.

Duco has sales of FF300m ($50m) and employs 500 people, all of whom will most likely be kept on by the new management It has a plant in Arpajon, south of Paris and one in Stains, north of Paris.

MTM BUYS UK FIRM

MTM of the UK has completed the acquisition of AP Chemicals Ltd. of Leek, Staffordshire AP Chemicals specializes in the manufacture of fine chemical intermediates for the pharmaceuticals, cosmetic and oilfield industries.

The price paid was £2m ($3.3m), including £1m in cash and £500,000 by the allotment of 245,700 MTM shares on completion. The balance of £500,00 will be paid in cash on October 16, 1988. There is a 12-month restriction on the sale of the consideration shares, which will not be included in dividend payments in late October.

AP Chemicals has assets valued at £600,000, mainly in land, plant and equipment and pretax profits of £300,000. Duncan Bray, former owner of AP Chemicals, will continue as managing director for three years as from October 16, 1987.

FERRO BUYS POWDERS

Ferro (Great Britain) Ltd., a subsidiary of Ferro Corporation of the US, has acquired MacPherson Drynamels Ltd. of Aldridge, West Midlands. The company is a major powder coatings manufacturer, with sales of some $7m a year.

The acquisition gives Ferro the MacPherson Drynamels product line with the widest range of finishes available in the UK, as well as a manufacturing plant and offices. Adolph Posnick, president of Ferro, said the deal strengthened Ferro's worldwide position as a leading manufacturer of powder coatings. This business involves the most rapidly expanding technology among Ferro's speciality coatings products, the company says.

U.S. CARTEL TRIES TO HALT BOTSWANA SODA ASH PROJECT

Agreement has been reached by the South African and Botswana governments on a project to recover soda ash from the remote Sua Pan carbonate-containing brine deposits in Botswana. However, a US soda ash cartel is trying to kill the project by discouraging buyers in neighbouring South Africa.

The project has been under discussion since at least 1984 when South Africa's AECI shelved plans to produce synthetic soda ash in South Africa in favour of the Botswana project.

Until September 1986 BP Minerals was co-operating with AECI on the project but the UK company pulled out for unstated reasons. The withdrawal was said to be "not on economic grounds."

The economic viability of the Botswana project is said to be "not in question" by sources associated with the feasibility study. The project envisages production of 300,000 ton/year of soda ash from the deposits, as well as 600,000 ton of high-grade salt. Around 95 per cent of the soda ash would go to customers in South Africa, most of which are currently supplied with soda ash imported from the US and elsewhere including ICI in the UK which owns one-third of AECI. Other sales would be in Zimbabwe, Zambia and Namibia.

The salt from the project would be sold on lucrative central African markets, supplying nearly the entire demand there. The timing of the project is not clear yet but it would take around two and a half years from start to finish.

It is to be based on Kerr McGee technology which has been upgraded by BP Minerals and AECI and tested on a pilot plant run for the project by BP Minerals. This company is hoping to recover from ACEI some of the substantial sums it spent on the project before the top level decision was taken to pull out.

In trying to halt the Botswana project, the cartel of US soda ash producers from Wyoming — the American natural soda ash corporation (Ansac) — has made strong allegations in a letter to most of South Africa's soda ash buyers. John Andrews, the predent of Ansac says that:

— Botswana is politically a skier source of supply than the S.

— The only successful soda sh project developed since 974 have been those based on atural trona deposits in the US.

— The Botswana soda ash is ikely to be much more expen- ive than that from the US.

— The Botswana material is nlikely to be as pure as that om the US.

Mike Sander, chief executive f AECI counters that the Sua an project is feasible at cur- ent prices and the product ould be pure.

One of the prior requirements or the project was that the South frican government would apply ntidumping duties on US soda sh if there were attempts to un- ercut the price of the Botswana roduct. A complicated trigger echanism has been worked out ased on the US east coast price f soda ash.

Another guarantee sought for e project was that the local tax egime would be adjusted to llow capital repayment. The perators were also asking for a uarantee that a railway line eed not be built and that pro- uct could be transported to outh Africa by road. The pro- ect team has also asked to build s own power station based on earby coal.

IO SELLS STAKE TO AYS TEAM

The Kuwait Investment Office KIO) is selling its interest in the lays group, the UK industrial ervices conglomerate, to a man- gement buyout company for 225m ($418m). Hays group wns the chemicals distribution oncern Hays Chemicals.

The sale will be to a new company formed by the present chief executive of Hays, Ronnie Frost, and his management team and is believed to be the UK's third largest buyout.

The KIO is taking a 25 per cent stake in the new company alongside a number of other institutions led by Electra Candover Partners. Barclays de Zoete Wedd is leading the banking syndicate.

In announcing the deal the KIO said : "Since we acquired the Hays group in August 1980 we have seen the group grow and develop in a very successful way. Our decision has been taken in order to give the management team full freedom to realise the potential of the group for future growth as an independent company.

Frost commented: "The whole management team has enjoyed a long and happy business relationship with the KIO and this major development will enable us to expand the company still further in a number of areas. It is our intention to go to the stock market for a full listing at a suitable opportunity."

In the year ended June 30, 1987 the Hays group made a profit before tax of £28.5m on a turnover of £606m.

BIOCATALYST BUYOUT

The management team at UK enzymes company Biocatalysts has acquired the company from the original owners Grand Metropolitan Innovation in a £1.2m ($1.98m) management buyout. Support was given by the Welsh development agency and the Welsh venture capital fund.

These two bodies are expected to hold approximately 25 per cent each of Biocatalysts with the management team holding the remainder. Biocatalysts is expected to report a turnover approaching £500,000 this year.

It will focus on enzymes for the production of optically active intermediates for the agrochemicals and pharmaceuticals business.

BANKS RECONSIDER ERT

The steering committee of banks may again be considering a proposal to renegotiate repayment of ERT's debt following a meeting with representatives of the Torras-Kuwait Investment Office, a 24.9 per cent shareholder in ERT. A few weeks ago a rescue proposal put together by ERT's chairman, Jose Maria Escondrillas was vetoed by one bank, Credit Commerciale de France.

The KIO has already stated that it would like to sell parts of ERT and restructure its chemical operations, a plan which is opposed by Escondrillas. The steering committee is to look at the KIO plan and given an opinion soon, however.

The meeting of banks and shareholders was a surprise to Escondrillas, according to ERT sources, as the banks were seen to have placed themselves in the position of arbitrators in the dispute between Escondrillas and Torras-KIO.

A source close to the banks said they did not favour either side but it was necessary to agree a restructuring of ERT's debt with all concerned.

The banks were critical of Torras-KIO for approaching the steering committee with its plans for ERT only after it was apparent that most shareholders were in favour of the Escondrillas plan.

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Chemical Markets Abroad

EUROPE'S FIRST LIQUID H_2 UNIT BEGINS PRODUCTION

Air Products has brought a 1, 650 ton/year liquid hydrogen plant on stream at Rozenburg in the Netherlands, Europe's first commercial-scale plant for the product. The company is the world's leading supplier in the relatively new market of liquid, as opposed to gaseous hydrogen. Its main competitors are Union Carbide and Air Liquide.

Liquid hydrogen offers advantages over the gaseous product as all impurities present in the latter, apart from chemically-inert helium, freeze out when it becomes liquid. The result is a 99.999 per cent pure product, which is cheaper to store and transport.

The electronics industry uses liquid hydrogen as a carrier gas in semi-conductor manufacture and petrochemical manufacturers use it on a spot-delivery basis when gaseous hydrogen production plants are out of service. Other end users are the food industry (for oil and hardening) and the metal industry (for annealing). In the US, Air Products supplies liquid hydrogen as a fuel for the federal government's space shuttle.

Chris Bris, Air Product's European business development manager for hydrogen estimates that the company holds a 60 per cent share of the European liquid hydrogen market and about 50 per cent of the gaseous market. Air Liquide holds about 20 per cent of this and the rest is split among Linde, Messer Griesheim and BOC.

The company says the timing of the new unit is opportune as a 3,300 ton/year plant under construction by rival Air Liquide at Waziers in northern France, had been delayed. In the meantime Air Liquide has to rely on shipments from its Canadian plant to serve European customers.

A spokesman for Air Liquide said the delay was due to lengthy discussions with the French authorities over environmental protection, and the plant is schedul- this year. Air Liquide has already started up a sister unit in Japan and has a further facility in Canada slated for start-up later this year.

Demand for liquid hydrogen is expected to grow in Europe, especially if it becomes accepted as a car fuel. Another similar-sized new plant could be justified in Rozenburg in three to four years, Bris says, if this is the case.

He expects to have some five electronics customers and 10-15 chemical industry customers for produce from the new unit a year after start-up. By then, four or five electronics-grade storage tanks should be in place for liquid hydrogen around Europe. At the end of two years, output should be split 50/50 between the electronics and chemical industries.

Today, Air Products' biggest contract is with Philips, involving the supply of liquid hydrogen for use in silicon chip production. A 70-ton hydrogen storage sphere at Tozenburg should cater for the somewhat erratic demand characteristic of chemical industry customers, as well as seeing Air Products through maintenance shutdowns, the company says.

Air Products also produces liquid hydrogen in New Orleans, Sacramento and Sarnia. The New Orleans plant, at 21,500 ton/year, is its largest. It has 26 other plants worldwide. The hydrogen plant is one of several coming on stream at the Rozenburg complex. Other new units for argon, oxygen and nitrogen together represent an investment of $200m.

AGROCHEMICALS UNIT COMES ON STREAM

Finland's Kemira has brought a $100m agrochemical complex on stream at Kokkola on the country's west coast.

The facility will produce phenmedipham (an active ingredient in sugar beet herbicide) and carboxin, which is used in fungicides for seed treatment.

Kemira will export most of these two products to the Soviet Union under a 14-year contract signed in 1986. The Kokkola facility will also produce meta-aminophenol, an intermediate in phenmedipham production, which will be marketed in the West.

All wastes from the processes will be dealt with at an incinerator built in association with the plant, the company said.

DU PONT/OLIN COMPLETE CHLORALKALI FACILITY

Du Pont and fellow US concern Olin Corp. have completed construction of a 218,000 ton/year chloralkali facility at Niagara Falls, New York. The $150m plant will begin operation in December.

Based on the latest membrane cell technology, the partners claim the facility will be the largest grassroots membrane cell plant in the US. The unit will be located on Du Pont property next to existing Du Pont and Olin facilities and will be operated by the company.

At the same time, Olin will continue operating an existing chloralkali plant which also produces potassium hydroxide.

El PASO STUDY PROMPTS PE RESTART

El Paso Products Co. of the US has announced the restart of a 68,000 ton/year high pressure low density polyethylene (ldPE) plant at its Bayport, Texas facility.

The decision to restart the idled unit was based on a market survey carried out by the company into the growth of low and linear low density polyethylene in the US to 1992. According to El Paso, ldPE will continue to dominate the market holding a 55 per cent share in 1992 although its share will be eroded from a current level of around 59 per cent by lldPE.

The study predicts that the rate of lldPE penetration into the total ldPE market will slow in the next five years. It claims that until recently, lldPE growth rates have been distorted by the conversion of captive film plants by major lldPE producers.

Downgauging, the main advantage of lldPE over lDPE is already 90 per cent complete, the report states, and in some cases, downgauging of films is being reversed for the sake of packaging image. Customers, it says, associate the thickness of the package with the quality of the products. It predicts that lldPE will grow at 5 per cent through to 1992.

Although a number of forecasts have predicted no growth for ldPE, El Paso maintains that the product should see an average annual growth rate of 1.1 per cent to 1992. The study predicts that ldPE will continue to dominate speciality markets such as extrusion coating and a majority of film applications.

The report warns that there is a possibility of overcapacity in lldPE by 1992 if all debottlenecking and new plants are completed and begin to affect US exports.

SAUDI START-UP

Saudi Arabia's Petrokemya, a subsidiary of the state industrial concern Sabic, has begun production of butene-1 at Al-Jubail. The 50,000 ton/year unit will supply feedstock for the PE resin production.

The facility will use up to 50,000 ton/year of ethylene from Petrokemya's 500,000 ton/year complex at Al-Jubail, thus reducing ethylene exports. According to Sabic vice-chairman and managing director Ibrahim Ibn Salamah, it will also cut Sabic's need to import butene-1 for the production of lldPE and hdPE resins.

The butene-1 unit uses technology licensed from France's Institut Francais de Petrole (IFP) to dimerize ethylene in the presence of a catalyst. Meanwhile, Petrokemya is also planning start-up of a 100,000 ton/year polystyrene unit next year.

ALKYL AMINES

Alkyl amines Chemicals hopes to complete its project for debottlenecking the triethylamine capacity by the end of this year with the commissioning of additional equipment at its plant on Patalaganga. With the implementation of this project, the availability of triethylamine in 1988 will increase substantially.

The company's recent right issue of 2.20 lakh shares of Rs. 10 each was fully subscribed. The company has finalised the basis of allotment and the share certificates and refund orders will be posted in the third week of November.

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In the European market

Naphtha prices were slipping mid-week after rallying earlier on the back of stronger crude.

Propylene prices are steady, with supply limited by a number of European cracker shut-downs. Producers are quoting spot prices up to DM650/ton delivered. A deal was done in West Germany at DM590/ton free delivered (DM530/ton cif Antwerp).

Ethylene prices are firm and steady at $475-485/ton cif NWE and $460-470/ton cif Med. Free delivered prices on the ARG pipeline are quoted at DM890-910/ton. Severe weather conditions have hit UK production, and spot business has been brisk.

After dipping to around $261/-ton cif Rotterdam, benzene prices have recovered.

The toluene picture is similar. After peaking at around $228/-ton, prices dropped back to $212-215/ton, but recovered on the back of stronger gasoline prices and chemical industry demand.

Solvent xylenes prices are steady at $230-235/ton, but higher numbers have been heard, and firmer oil prices should underpin xylenes. Supply is tight and a bid of $235/ton was turned down.

Paraxylene prices could recover following brisk trader business and some spot demand from fibres producers. Soviet supply is mainly committed.

Orthoxylenes prices are steady but weak. Deals were reported mid-week at $260/ton for prompt delivery. But producers such as Total and Exxon are prepared to cut back rather than work with such slim margins.

Methanol prices remain steady at DM231-237/ton fob Rotterdam and $105-107/ton cif NWE. Prices continue to be buoyed up by good demand from the chemica industry, and firmer MTBE prices, which have risen to DM440-445/ton fob, with $450/ton on the way. MTBE is expected to remain firm until mid-November when Brazilian imports arrive. Gasoline blenders meanwhile, are looking to other octane sources. European supply remains tight, and stocks low, with plant closed in East Europe.

Butadiene closures in the US and West Germany, and strong demand from the US and Fa East have combined to push up butadiene prices by another ten dollars in the past week. Fourth quarter contract prices have been agreed at DM1,070/ton in West Germany.

Styrene prices are firm at $1,230-1,250/ton fob Rotterdam for T2 and $1,160-1,170/ton cif for T1. Business has gathered momentum since fourth quarter contract prices were accepted at DM2,200/ton notably by Bayer. The market is tight in Europe and the US. Sterling is closing for maintenance and has informed customers of delayed liftings. Arco is closing and Amoco Chemicals still has technical problems at its 225,000 ton/year Texas City plant. Demand remains strong, although there are signs that interest in polystyrene may be softening. CdF Chimie is closing a styrene plant for "checks," and an Ato plant has suffered storm damage.

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News from the American market

LIN UPS ITS PRICES FOR RFACTANTS

Olin Corp. has increased its
-list prices for Poly-Tergent
series surfactants by 3 cent/
The move, effective Oct. 1
spot customers and accord-
g to terms for contracts, will
push tabs above current list
rels. Olin also raised prices,
Waychem tolytriazole and
nzotriazole specialty chemi-
s, effective Oct. 1. The list
ce of Wayzole tolytriazole
50S is 98 cent/lb in bulk and
.10/lb for drum quantities.
um quantities of 99P ben-
triazole, $6.30/lb; and TT100
ytriazole, $2.84/lb.

TITANIUM DIOXIDE PRICE OOST IS WELL SUPPORTED

Producers have fallen into line.
nind the Oct. 1 price increase
titanium dioxide. For example,
Pont, the largest producer,
sed its price for rutile coatings
rries by 2 cent/lb, all other
ms of TiO_2 by 3 cent/lb. The,
ve brings the price of Du
nt's standard rutile dry grade
84 cent/lb. Du Pont, which
s not been making anatase for
out two years, has been buying
t type but gradually convert-
its anatase customers to use
rutile-grade material. The
npany says that rutile-grade
terial accounts for about 80%
the U.S. market and plans to
nove anatase grades from its
ce list in January 1988. Kerr-
Gee, the third largest U.S.
O_2 producer, also makes only
ile-grade material. SCM Che-
cals (Baltimore), the second-
king producer, has raised its
t. 1 price for anatase slurry 3
nt/lb, to 81 cent/lb, and dry
atase 4 cent/lb, to 82 cent/lb.
M's new price for rutile TiO_2 is up 3 cent/lb, to 84 cent/lb for dry material and 86 cent/lb for chalk resistant and slurry material.

HIMONT RAISES PREMIUM POLYMERS PRICES

Himont U.S.A. (Wilmington, Del.) has raised its prices for 1900 UHMW (ultra high molecular weight) and VHMW (very high molecular weight) polyethylene, effective Nov. 1 The new truckload price for UHMW polymer, boxed and bagged, is $1.06/lb. The new price for VHMW polymer is 94 cent/lb for grade HB301 and $1.06/lb for HB312. Drum shipments carry a 2 cent/lb premium above the truckload prices of boxed and bagged shipments. The high-performance materials are used in replacing metals and in other applications, where high-impact strength, lubricity and resistance to abrasion, and corrosion are important. Trade sources say world capacity of the UHMW material is 70 million lb/year; demand, at 50 million lb/year, is growing 5-10%/year.

A MARKETING PUSH IS SCHEDULED FOR MILORGANITE

Milwaukee's Metropolitan Sewerage District is putting a renewed push behind Milorganite specialty fertilizer derived from sewage sludge, which is used for lawns, turfgrass, flowerbeds, shrubs and ornamentals. The district will soon launch its first venture into formulated products containing other nutrients with test-marketing of new boxed products tentatively trademarked Flourish. Three product types will be offered, each formulated for a specific market: a rose food, flower and garden products, and products for trees & shrubs. The district will soon start to build a new $120 million Milorgranite production complex at its Jones Island wastewater treatment plant to boost Milorgranite capacity about 25%, to 75,000 tons/year, when it is completed in 1996.

THE EUROPEAN COMMISSION TAKES DUMPING ACTIONS

The Commission of the European Community (EC) has opened an antidumping inquiry into exports of choline chloride from Belgium to Spain. Such inquiries are usually made only on complaints against non-EC countries. However, Spain and Portugal are in the transitional period for entry into the EC, and anti-dumping duties can still be imposed on trade between them and other 10 member states. The investigation follows a complaint by the Algri, S. A. subsidiary of Explosivos Rio Tinto that Belgian shipments to Spain rose from zero in 1985 to 908,000 m.t. in 1986, and again to 606,000 m.t. in the first third of 1987. Belgium's share of the Spanish market for the material was 50% in the first four months of 1987, compared with 25% in 1986, according to the complaint. The commission has invited interested parties to present their views by the end of October. In other moves, the commission reimposed customs duties on EC imports from Mexico of lysine and its esters and their salts, and on imports of Indian aluminum chloride. The commission should report soon on an inquiry into imports of paracetamol from China, following a complaint by the European Council of Chemical Manufacturers' Federations that the imports are sold at less than market prices.

Technological Scene Abroad

A NEW WAY TO MEASUURE RELATIVE HUMIDITY

Peter H. Huang, a scientist at the U.S. Commerce Dept.'s National Bureau of Standards (Gaithersburg, Md.) has a developed a device that uses organic polymers to sense and measure humidity over a wide range of conditions. U.S. patent 4,681,855 describes the device. It depends on depositing a mixture of a strong and a weak acid as a film on a halogenated polymer, such as Teflon fluorocarbon. Huang says that he has had the most success with sulfonic and carboxylic acids. It is the ratio of the two acids that is the key to the system's accuracy. Since sulfonic acids attract water molecules more strongly than carboxylic acids, the ratio can be tuned to measure humidity.

ARGONNE FINDS A KEY TO SUPERCONDUCTIVITY

High-temperature superconductivity in yttrium-barium-copper oxide appears to be caused by one-dimensional chains of copper and oxygen atoms, say scientists at Argonne National Laboratory (Argonne, Ill.). Two-dimensional copper-oxygen planes contribute, but the absence of chains destroys superconductivity.

A FRENCH EFFORT IN ANTITHROMBOSIS DRUGS

A joint venture to develop and produce antithrombotic agents through genetic engineering techniques will be undertaken by a joint venture of French pharmaceutical company Sanofi (Paris and French biotechnology con pany Transgene (Strasbourg). A a first goal, the new compan Sotragene, plans to begin indu trial production of the protei hirudin, a powerful thrombin in hibitor. In nature, hirudin is se creted by leeches to prevent th coagulation of their victim' blood for better retention. Tran sgene has developed a high-yiel method of synthesizing activ and homogenous hirudin molec ules, expressed in bacteria an yeast; the product has proved e fective in animal tests. Sanof a major producer of antithrombo sis drugs, will handle clinica trials and international develop ment of hirudin; Transgene wi work on new applications. Sano fi and Transgene expect to deve lop markets in treating thrombo sis inhibitor deficiency, in diag nostics, in treating heart cond tion complications during surge ry and in hemodialysis.

DEVELOPING ENZYMES FOR WOOD PROCESSING

For the past three years, tw companies — Finnsugar, whic is an industrial enzymes produ cer, and La Cellulose du Pin, subsidiary of France's St. Gobai group — have been separatel researching how enzymes migh be used to improve wood an pulp processing. Now the tw have decided to meld their e forts by forming a 50-50 join venture company, Biopulp Inter national (Paris), to develop an market enzymes for wood pro cessing and paper production Initially, the venture aims to de velop products that degrade an modify lignin. The $16 millio that is needed to support the ver ture will come from Europe' two-year-old, $1 billion Eurek gram, which fosters coperatio among European countries on de veloping technologies.

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POINT DESIGN

TRANSATLANTIC PACT IN EALTH PRODUCTS

Pitman-Moore (Northbrook, .) and French animal health ompany Rhone Merieux, a subdiary of Rhone-Poulenc's drug m, Institute Merieux, say they ill team up to research, devep and market selected health roducts. Under the pact, Pitan-Moore will contract producon of vaccines and diagnostics Rhone Merieux beginning in te 1989. Pitman-Moore will arket selected Rhone Merieux roducts in the U.S.; Rhone Meeux will market Pitman-Moore's nimal health products internaonally.

EW MEMBRANES FOR EW JOBS

Membranes to remove organic ollutants from industrial wastevaters and chlorine-resistant nembranes for use in water reatment are being developed by Bend Research (Bend, Ore.) under contracts from the Environmental Protection Agency (EPA) and the National Science Foundation ,NSF). The EPA contract will use a technique known as pervaporation, which involves a combination of evaporation and permeation through a membrane. The process employs vapour pressure and heat as the driving force for separation according to Scott McCray, project manager for Bend. Low-grade waste heat is applied to the waste stream on one side of the membrane; a vacuum is applied on the other. Pollutants, plus water vapour, are pulled through the membrane and may be further concentrated in subsequent separation stages. McCray notes that pervaporation is now used to break the ethanol-water azeotrope but has not been used for waste treatment. Bend plans to demonstrate the feasibility of the know-how in waste treatment. In the NSF contract, chlorine-resistant thin-film polymeric membranes for reverse osmosis systems are being developed under the second phase of an NSF project. In phase I of the contract, Bend found that certain polymeric (amine or amide) linkages are more susceptible to chlorine attack than others, says McCray. However, when only the resistant varieties were incorporated into membranes, flux (flow rate per unit area) declined severely, although selectivity was still good. The company hopes to resolve this problem in phase II.

HOT WATER MAKES WASTE WORK

Tapping industrial wastes for valuable components is not a new idea. Nor is hydrothermal technology, which has been used by the metals industry for years to separate metals out of ores. But Battelle Laboratories (Columbus, Ohio) has come up with a method that it says makes use of a hydrothermal process to recover substances from industrial wastes, then market them or recycle them back into the manufacturing process. Battelle, which began to market its hydrothermal technology for waste materials to its clients about a year ago, is now making the technology available to the general industry.

In addition, Battelle is building a 25-tons/day pilot plant that uses the new technology. The unit is slated for completion in mid-1988. And, says Edgel P. Stambaugh, research leader of hydrothermal technology at the Battelle Columbus Div., plans are being developed to establish a Waste Treatment Utilization Center at Battelle.

A step beyond

The new technology can custom-tailor oxides, sulfides and metals from industrial waste for specific applications, says Stambaugh. It goes a step beyond leaching, the approach traditionally used in the metals industry to separate metals from ores, Stambaugh told corporate executives recently at a Battelle-sponsored symposium on Hydrothermal Treatment of Waste Materials in Columbus, Ohio. Battelle's technology uses precipitation and leaching to produce advanced inorganic oxides from waste materials.

The process has much to recommend it, says Stambaugh. Precipitation permits control of the size of the crystal in the production of advanced inorganic oxides for the pigment and ceramic industries. Sizing can be varied from 0.01 micron to several microns. And besides oxides and sulfides, metals, such as nickel, cobalt, gold, silver, lead, mercury, tin and platinum, can be recovered.

Hydrothermal processing uses a solution chemistry of hot water alone or with other inorganic or organic materials under pressure. Basically, the process involves heating an aqueous solution containing a soluble metal species in a closed vessel above 100°C, but less than the critical temperature of water, for a period long enough to promote the precipitation of the desired product. By manipulating the solution chemistry of hot water under pressure, the physical, chemical and electronic properties can be engineered for specific applications.

News About New Projects

ATOCHEM CONFIRMS STYRENE INVESTMENT AT GONFREVILLE

France's Atochem, a member of the Elf Aquitaine group, has confirmed that it plans to expand the styrene plant at Gonfreville-L'Orcher.

First revealed in **ECN** August 31, the project, which will cost about FF300m ($50m), involves modernization of the ethylbenzene and styrene production facilities at Gonfreville, near Le Havre. The modernization, Atochem confirmed, will add 100,000 ton/year of capacity.

When completed in 1989, the old 60,000 ton/year styrene unit at Lacq will be closed down which will give Atochem a net increase of 40,000 ton/year of styrene monomer.

The amount of styrene available for the open market will remain unchanged, Atochem says, adding that the new capacity will balance the demand resulting from its present international polystyrene production activities and the impending closure of the Lacq unit. At present Atochem sells about 100,000 ton/year on the open market.

Atochem is Europe's fourth largest producer of PS with plants at Gonfreville (150,000 ton/year), Stalybridge, UK (50,000 ton/year) and Prat de Llobregat, Spain (55,000 ton/year). The latter, Ato Iberica, has recently been bought from Arco. It is this plant that will need the extra styrene tonnage but in the future Atochem could expand PS capacity.

Atochem has enough ethylene feedstock for the styrene capacity. In benzene it is a different matter, however. At present the company produces 250,000 ton/year of benzene and consumes the same amount. It produces in the south where it has no requirement but it has an internal deficit in the north. At present it buys 100,000 ton/year of benzene and when the expansion is completed purchases will rise to 200,000 ton/year.

The company has not yet announced who will build the plant. The original unit was built in 1972 using CdF Chimie's process and Technip's services. In 1982 the complex was modified by Lummus using the Monsanto process.

PENTA CONFIRMS METHANOL PROJECT

Further details have emerged on projects planned by the Turkish trading company Penta Dis Ticaret. The company has confirmed that it is in discussions with the Soviet Union on a methanol project.

"The Soviets are very much interested and are ready to give us technology," Nesrin Erem of Penta Dis Ticaret said. The company will buy natural gas from the USSR which will be used as feedstock. The project would therefore receive total support from the USSR.

At present around 70,000 ton/year of methanol is imported into Turkey and, as a Sabic agent, Penta has much experience in methanol trading. A decision on this project will be taken after the November elections.

It is not clear which process Neftechnimexport is proposing. The bulk of the Soviet Union's own methanol capacity is based on technology acquired from ICI of the UK.

The Soviet Union is apparently not involved in discussions on the styrene monomer project. Discussions on this plant ar well advanced with a US con contractor which has alread gained board approval for th project.

Around 100,000 ton/year o benzene feedstock is availabl from Petkim, Erem said, and, i Petkim cannot supply, Bulgari and the USSR are good source for the aromatic. Bulgaria wants styrene in return for benzene o which it has 15,000 ton/year to spare.

SUNLAND AWARDED SIX CONTRACTS

Sunland services, a subsidiary of Barnard and Burk of the US, itself a member of the Matthew Hall group, has been awarded construction contracts from six clients, valued at a total of £5.6 m.

The orders include construction of the first phase of a new amines production unit at BASF's Geismar, Louisiana complex and construction of additional effluent treatment facilities at the ICI Americas-Rubicon Inc. plant, also in Geismar.

For Dynamit Nobel, Sunland Services will carry out mechanical erection of an addition to a chemical plant belonging to Dynamit Nobel's Kay Fries division at Theodore, Alabama and for Vulcan Chemicals' construction associated with an addition to an effluent treatment system at its Geismar complex.

At Baton Rouge, Louisiana, Sunland will carry out modifications to offsites for Exxon Refining and in Waveland, Mississippi it will carry out modifications to tank farm piping for Borg-Warner Chemicals.

ICI AUSTRALIA BUILDS SODIUM CYANIDE UNIT

ICI Australia plans to build an Aus$30m ($21.4m) plant to produce sodium cyanide for the fast-growing Australian gold industry. The plant will have an initial capacity of 20,000 ton/year but will be designed for easy expansion to meet market demand. It will use the latest ICI technology to produce solid sodium cyanide.

The solid grade is necessary for safe handling and transport to gold mines in remote locations across Australia.

The Australian gold industry, predominantly uses a recovery system based on sodium cyanide, and ICI Australia serves a major share of that market with product imported from ICI in the UK.

Local manufacture will ensure supply to customers and assist the Australian economy by replacing imports. Location of the plant is being finalised with several sites under active investigation.

DU PONT IN TURKISH NYLON YARN PROJECT

A joint venture formed between Turkey's Haci Omer Sabanci Holding and the Du Pont Co. of the US has begun construction of a new facility to produce industrial nylon yarn for tyre reinforcement and other applications. The plant will be located at Izmit.

The new venture, called Dusa, will utilize components of existing nylon production equipment transferred from one of Du Pont's US facilities. The output of approximately 20,000 ton/year will be shared between Sabanci for internal use and Du Pont for sale to other markets.

The new plant will not add to worldwide industrial nylon capacity, but will allow Du Pont to diversify its production geographically. At present output is confined to the US. The plant will be fed mainly with ingredients derived from Du Pont's European adiponitrile production, the US company says.

BERULIEU TO PRESS ON WITH BF3BN PP PLAN AT DUNKIRK

Beaulieu, the Belgian carpet producer, is going ahead with plans to build a BF3bn ($78.4m) polypropylene plant despite the fact that since the announcement of its intention, several producers have said they would build new plants.

Paul Delbaere, general manager of Beaulieu said that price politics as well as growing shortages are the main reasons behind the plan to build a new 120,000 ton/year plant. The unit will be built at Dunkirk in France on CdF Chimie's site but it will be wholly-owned and operated by Beaulieu Chemicals.

The general manager said the site was chosen because: "There is a cracker there which would avoid transportation and we are not too far from there". Construction will take about two years and is due for completion in 1989.

Currently, the company needs 60,000 ton/year of polypropylene which it buys from Montefina, Shell and ICI. In a few years Beaulieu's demand will increase to 90,000 ton/year and, says Delbarere, the company may eventually use the total output from the planned facility. Polypropylene carpets, which are much cheaper than nylon, are taking over from polyamide, he said.

All of Beaulieu's current suppliers have announced major polypropylene expansion plans. ICI said it is raising capacity by one third by adding some 110,000 ton/year of new capacity at Wilton in the UK and Rozenburg in the Netherlands. Shell has announced plans for a major new 120,000 ton/year PP unit to be located on land it acquired near the ROW joint venture at Wesseling, West Germany.

Himont, the world's largest producer has just unveiled plans to build a PP facility in a 50-50 joint venture with Statoil at Antwerp, Belgium, Beaulieu's home ground, and Neste, Europe's newest PP producer is doubling its Belgian PP capacity to 240,000 ton/year.

Meanwhile, France's CdF Chimie plans to double its Dunkirk ethylene capacity to 450,000 ton/year if it can find a partner.

NOBEL KEMI ACQUIRES WEATHERLY

Nobel Kemi, a unit of Nobel Industries Sweden, has signed an agreement to acquire the D. M. Weatherly Company as of January 1, 1988. The latter is a family-owned Atlanta, Georgia-based engineering company specializing in the construction and marketing of nitric acid and ammonium nitrate plants.

Founded in 1954, D. M. Weatherly has 30 employees and its turnover in 1986 was around SKr50m ($7.8m). It will be incorporated into Nobel Chematur, an engineering subsidiary of Nobel Kemi, which designs and markets chemical plants and has a total turnover of approximately SKr250m.

One of Nobel Chematur's main areas is process plants for nitrations, (eg intermediates for the pigment industry). As a result of the acquisition its process supply will be broadened. The D. M. Weatherly Company will also give Nobel Chematur a foothold in the important US market.

Outlining plans for the merged operation, Lennart Ivnas, managing director of Nobel Chemicals Ltd., said that the D. M. Weatherly nitric acid plants are up to 40 per cent cheaper than those offered by competitors. For a 1,000 ton/day plant, supplied on a turnkey basis, D. M. Weatherly charges $15m in the case of lower temperature expander and $17m when the high temperature expander is used.

Although D. M. Weatherly claims to have supplied 90 per cent of all US nitric acid plants, its European activities have so far been limited. This, the partners hope, will be increased through the access to Nobel Chematur's international marketing organization. Already major European manufacturers have shown interest in the D. M. Weatherly processes.

The US firm has recently commissioned the second nitric acid plant utilizing its new vertical high efficiency design. The unit, incorporating cogeneration of electricity, was built for Fertilizers & Chemicals Ltd. The first unit using this design was delivered for Vicksburg Chemical at Vicksburg, Mississippi.

IRAN TO BUILD NEW CARBON BLACK PLANT

Iran's Doodeh Sanati Pars Co. is to build a new carbon black plant. The company is currently seeking agreement and technology know-how for the plant which will be based some 120km south of Teheran, according to Mr. H. Maleki, vice-chairman of Doodeh Sanati Pars.

Phase I of the facility will have 15,000 ton/year capacity, while the second phase of the carbon black project will comprise a 30,000 ton/year unit.

CONOCO REFINERY TO MAKE PROPYLENE

Conoco, a subsidiary of Du Pont, is installing an alkylation and a propylene unit at its South Killingholme, Humberside refinery in the UK. The units are designed to upgrade part of the existing liquefied petroleum gas production to higher value products.

Due on stream in mid 1989, the alkylation unit will convert butane into more valuable high octane gasoline. The second plant, also due to start-up in 1989, will recover propylene at a rate of 3,000 barrel/day from current propane production for sale as a high-value petrochemical feedstock and help alleviate shortages of this monomer.

Duane Skogen, managing director, refining, said that these two projects will ensure that Conoco maintains its pole position in European refining and will also provide gasoline components for the unleaded market of the future.

A mechanical engineering contract has been awarded to Matthew Hall Engineering and, wherever possible, full use of local Hunmberside contractors will be made during the construction phase.

In addition to the regular petroleum products, the refinery produces petroleum coke. This high-value product, primarily used for producing graphite electrodes used in steel smelting, has made Conoco one of Britain's top export earners.

TECNIMONT WINS PP CONTRACT IN CHINA

Italy's Tecnimont has won its second polypropylene contract in China this year. Valued at $40 m, the new order covers the construction of a 60,000 ton/year PP unit at the Fushun petrochemical complex, in the northern province of Liaoning. It will be based on the Spheripol technology licensed from Montedison's Himont subsidiary. Under the deal Tecnimont will supply engineering, equipment and technical assistance.

The polypropylene unit is one of several plants planned at Fushun. A 115,000 ton/year ethylene unit has reportedly been awarded to JGC of Japan. It will use the Stone & Webster technology. No decision has yet been made on the 80,000 ton/year lldPE, 10,000 ton/year butene-1, and 50,000 ton/year ethylene oxide units.

Earlier this year Tecnimont won a contract to build a 70,000 ton/year polypropylene plant based on Himont's technology at the Shanghai petrochemical complex. Sino Fluor Engineers, a joint venture of Fluor Corporation and Sinopec International is building a 70,000 ton/year Himont-process PP unit at the Qilu petrochemical complex in Shandon province.

FMC BOOSTS ITS PERSULFATE TABS

FMC Corp. has raised prices for ammonium, potassium and sodium persulfates by 5-6 cent/lb, effective Oct. 1. Truckloads (24,000-lb minimum of ammonium persulfate are $66.40/cwt (up $3.15) in 225-lb drums; $63.70/cwt (up $2.45) in 55-lb bags; and $63.70/cwt in intermediate bulk containers (IBC). Truckloads of potassium persulfate are $80.90/cwt (up $4.60) in 225-lb drums and $77.70/cwt (up $3.70) in 55-lb bags. Sodium persulfate is ($73.85/cwt (up $3.85) in 225-lb drums; $70.80/cwt (up $3.05) in 55-lb bags in IBC.

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Hoechst

A faster, cheaper assay for toxins

A new assay for toxic chemicals that uses bits of membrane from mitochondria — the organelles that produce energy in mammalian cells — has been developed by the University of Wisconsin (Madison). The assay, said to be fast, sensitive and cheap, could find use in monitoring water quality and in determining effluent toxicity, as well as in screening food additives, agricultural chemicals and drugs. Says the assay's developer, John M. Harkin, associate director of the university's Environmental Toxicology Center, "Mitochondria are supersensitive to all sorts of chemicals — which has given rise to the expression that they can smell a flea's flatus from 30 feet away."

The university, through the Wisconsin Alumni Research Foundation, has applied for patents on the assay. The foundation is currently negotiating with an analytical instrumentation company regarding an exclusive licence to commercialize the assay. Harkin believes, however, that a commercial test is "still a year or two away."

The test could be a boon to water quality and pollution control laboratories. The present toxicity test approved by the Environmental Protection Agency uses minnows. That test is "expensive and a real pain," declares a quality control researcher. It costs more than $700 for each chemical that is tested, and it requires 2-4 days for completion.

A researcher concedes that oxicity assays that use bacteria are fast and cheap. For example, he Microtox assay — supplied by Beckman Instruments (Palo Alto, Calif.) — measures a toxin's reduction of light emission rom Photobacterium phosphoreum. The test takes only five minutes and costs only $2. However, its correlation with the minnow assay is a mere 29%.

Fast results

The mitochondrial assay, on the other hand, has an 82% correlation with the minnow assay. It yields results in less than 10 minutes and should cost about $2/assay. Right now, the assay detects about 90% of known toxic chemicals, says Harkin. He believes, though, that it can be improved to pick up the remaining 10%.

Mitochondrial membrane contains enzymes that generate energy, principally in the form of adenosine triphosphate (ATP). ATP is produced by five enzyme clusters — each of which has several components — that participate in a series of reactions called oxidative phosphorylation. The enzyme clusters are particularly sensitive to damage by toxins, thus giving the assay its sensitivity.

Harkin isolates mitochondria from cow hearts obtained from a local slaughterhouse. Because the heart muscle requires a steady supply of energy, it is especially in mitochondria. And the University of Wisconsin, which does a great deal of research with mitochondria, has one of the few commercial-scale facilities for isolating mitochondria from hearts.

Particles.

Rather than use the entire mitochondria, Harkin prepares what he calls submitochondrial particles (SMPs) by subjecting the organelles to sonic waves. The SMPs are tiny spheres that contain the full complement of oxidative phosphorylation enzymes. Actually, SMPs are inside out bits of mitochondria: the enzymes are on the outside of the sphere rather than on the inside. That makes the enzymes easier to manipulate and to expose to toxins, says Harkin. In addition, SMPs can be stored indefinitely as frozen or freeze-dried powders. "That's what makes this assay great for commercial use," says Harkin. "The SMPs are like an ordinary chemical reagent — rather than something you have to grow on site." Ten kilograms of cow heart yield about 3.5 grams of SMPs, enough for approximately 5,700 assays.

Enzyme complexes.

Harkin can manipulate any or all of the five enzyme complexes involved in oxidative phosphorylation. Oxidative phosphorylation works like this: Enzymes in complexes I and II oxidize such substrates as malate and succinate to obtain electrons. The electrons are transferred from complex I or complex II, respectively, to complex III, then to complex IV and finally to oxygen. During each transfer, complex V produces ATP. In essence, the sequence is little more than a series of oxidation-reduction reactions.

Each reation can be blocked, however, bringing the oxidative phosphorylation to a halt. For example, cyanide, which is not used in the SMP assay, is poisonous because it stops the final transfer of electrons from complex IV to oxygen. That breaks the entire electron transport chain, starving the body of energy.

An important component in oxidative phosphorylation is nicotinamide adenine dinucleotide (NAD). The reduced form of NAD, written as NADH, carries electrons between complex I and complex III. NADH also is a key component in the mitochondrial assay because it strongly absorbs light at 340 nanometers (nm). But NAD does not absorb light at that wavelength. So the rate at which NADH is converted into NAD — and vice versa — can be measured simply by monitoring one wavelength of light. That rate, in turn, provides a quantitative measure of the rate at which oxidative phosphorylation is occurring in the SMPs.

Applied principle

Harkin has used that simple principle to develop two assays. In one test, called RET-ATP, for reverse electron transport driven by ATP, complex I is decoupled from the rest of the electron transport chain by the antibiotic antimycin. Complex III is used to feed electrons into complex I, reversing the normal electron flow. ATP drives the reverse reaction, forming NADH from NAD. The progress of NADH formation is measured by observing the increase in absorption at 340 nm for 2-5 minutes.

A toxin suppresses the rate of NADH formation, which shows up as a slower increase in absorption at 340 nm. Indeed, an absorption change as small as 10% can be measured routinely. Using RET-ATP, Harkin has detected as little as five parts per billion of pentachlorophenol, a pesticide that can cause lung and kidney damage.

The other assay is called ETR-NAD, for electron transport driven by NADH. In that assay, complex II and complex V are eliminated from the electron transport process by withholding the substrates required by those complexes. NADH is consumed by the remaining complexes, which shows up as a decrease in absorption at 340 nm. A toxin slows the rate at which the decrease occurs.

The two assays are complementary. The RET-ATP test is almost 500 times more sensitive to hydrophilic toxins than the ETR-NAD test, says Harkin. And the ETR-NAD test is about 230 times more sensitive to hydrophobic toxins than the RET-ATP test, Harkin, however, has no explanation for the phenomona.

Harkin is developing still more assays that make use of the sensitivity of oxidative phosphorylation to a variety of toxins. Says he: "We're pretty certain that SMP assays will eventually become standards."

BIOEUROPE COMPLETES ISSUE

Bioeurope, the Toulouse, France-based biotechnology concern has completed a second round of financing bringing the firm's capital from FF12m ($1.98m) to FF27m. Funds from this financing will be used to increase the research and marketing capability of the biotechnology concern as well as increasing the shareholder base.

This round of financing has been completed in two steps. Earlier in the year the original six backers were given the opportunity to increase their stakes. The second step completed earlier this month was reserved for new investors. Five new investors including Japan's Nippon investment and finance were found.

The French firm, which focuses on biocatalysis, enzymatic technologies and food technology, anticipates contract revenues totalling FF14m this year. Bio-Europe already has links with one US firm and is hoping to establish licensing deals next year. The company focuses on food bulking agents, ingredients for the cosmetics sector and chemical intermediates.

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Biotechnology & Environment

ECC AND US OFFICIALS SEEK HORMONE COMPROMISE

European and US officals are expected to hold discussions in London this week to avert a trade war over a looming ban on the use of hormones in beef sold in the European Community. The ban is scheduled to come into effect January 1, 1988, but it is possible that the European Commission may propose a postponement for one or possibly two years.

European agricultural ministers are believed to favour this option although they do warn that there should be no discrimination within the community. If the community does, under threats of US retaliatory action, alter its plans it will reverse the decision taken last month when member states rejected a similar proposal from France and the UK.

The UK has been challenging the legality of the hormone ban at the European court of justice. Supported by Denmark, the UK claims that there is no scientific evidence suggesting that growth hormones given to cattle pose a threat to human health. It says that the directive should have been introduced under the auspices of Article 100 of the European treaty which would require unanimous support before adoption.

Earlier this month, however, a preliminary opinion from advocate general Carl Lenz said that the European Council was in compliance with ECC law by basing the banning directive on Article 43 of the EEC treaty. Lenz believes that the hormones issue falls under consumer protection. Such an opinion is considered to be a reliable indicator of how the court of justice will rule.

Many chemical firms are spending a great deal of research resources to develop animal growth hormones using genetically engineered bacteria. Most firms have had to link up with biotechnology firms, forming ventures such as IMC and Biogen, Upjohn and Amgen, Monsanto and Genentech, American Cyanamid and Biotechnology and General. One key player which has not formed a joint venture is Eli Lilly.

Currently most of the biotechnology ventures have completed final field trials and the first commercial products could be ready as early as next year. According to UK analyst Wood Mackenzie the global market for these products will be about $300-500m "assuming that the political and welfare concerns associated with bovine somatotropin (beef growth hormone) do not present any obstacles to registration."

ROTTERDAM PLANS RHINE SUIT

Rotterdam's Harbour authority has threatened to sue chemical producers in West Germany, France and Switzerland if the heavy metal content of their discharges into the Rhine is not reduced substantially.

The authority recently commissioned a Dfl. 200m ($100m) artificial reservoir to hold polluted sludge. According to estimates, some 23m cbm/year of sludge can be dredged from the reservoir bed, but harbour authorities say the level of contamination is too high for either dumping at sea or for use in landfill projects.

Dutch officials are also planning to conduct an "upstream expedition" to track down the source of the harbour pollution.

West Germany's chemical industry association, VCI, claims that "only a small part of the metal pollution of the river is from German discharges." What's more, the association says, pollution of the Rhine with heavy metals has "declined drastically" in recent years and will no longer be a problem in the foreseeable future.

WAREHOUSE FIRE "CLOSE TO DISASTER"

A major fire on October 17 in a Dusseldorf warehouse where agrochemicals were stored came close to setting off an environmental disaster comparable to the blaze at Sandoz last year, according to local officials.

The storage facilities were shared by plant protectants distributor Indisco and exterminating firm Rentokil. Fire authorities said that "thousands of litres of highly toxic insecticides and herbicides, along with rat poisons" were washed into the sewage system, but were pumped out with the help of experts from nearby chemical firms Henkel and Bayer and taken to a special treatment facility. The warehouse had no containment basins for firefighting water, as would be required by legislation now in the pipeline.

TOXIC WASTE TRACE

A West Berlin environmental research institute INFU, and a local engineer, Jens Karstedt, have developed a new computer programme with which contamination of ground water under toxic waste dump sites can be traced and displayed.

In the past, results of ground water probes have had to be calculated and plotted manually, but with the help of the new programme the computer can graphically display the depth of pollution, along with the direction and speed of flow of the polluted water, according to Karsted. The programme, used for the first time in decontaminating the site of a waste oil dealer, is to be demonstrated at the Bigtech technnology exhibition in Berlin from November 10-13.

HOECHST WINS APPROVAL FOR INSULIN PLANT PROJECT

Hoechst has received official go-ahead from the state government of Hesse to operate the second stage of its three-phase project to produce gene-spliced human insulin.

The DM70m ($38.7m) plant, known as Chemtec, is a test production plant scaled up from the original fermentation stage (Fermtec) for production of pro-insulin. In the final stage — to follow the two-year test phase — Hoechst hopes to begin industrial production of gene-spliced insulin.

The state government said that approval of the final stage will be made subject to a public hearing. Earlier this year the Hessian environmental ministry, then led by a Green minister, demanded a public hearing for the Chemtec plant, but these plans were reversed by the Christian Democrats, who took over the ministry following the April state elections.

The state has placed a number of safety restrictions on the operation of the Chemtec plant. Although ecologists have expressed fears that manipulated Coli bacteria used in the production process could damage the environment, Hoechst maintains that sterilization of its waste water will prevent this — a view the state government said it shares.

According to Gerd Hobom of ZKBS, the central commission for biological safety, the plant includes more safety provisions than required by the commission's rules. Although these rules only regulate state funded research, private industry has committed itself to the rules until specific regulations are introduced.

Once all the test phases have been approved and completed, Hoechst expects to have an industrial scale insulin unit ready with up to three times the capacity of its original pilot plant.

Meanwhile the Hoechst subsidiary Behringwerke is conducting clinical trials of gene-spliced human insulin, but the drug is not a key component of the chemical major's drugs portfolio.

FDA MAY GRANT TPA APPROVAL

Genentech, the US biotechnology firm, may be granted approval for its product tissue plasminogen activator (tpa) by the US food and drug administration faster than some analysts have been predicting since the agency turned down the drug earlier this year.

At that time, the FDA advisory committee concluded that while there was impressive data for blood clot dissolution no evidence that the drug actually prolongs life had been submitted. Genentech has now provided the regulatory authority with the results of two placebo control experiments showing improved left ventricular function in the heart.

"We believe that the FDA now has all the data it needs to grant approval," a company spokesman said. The FDA office of biologica has already indicated to Frank Young, the FDA commissioner that the drug should be approved and could be given the go-head by the end of this month.

Earlier this month, Genentech's licensee Boehringer Ingelheim won approval to market tpa in West Germany. As the largest market for coronary thrombolysis and the third largest pharmaceutical market in the free world, approval in West Germany is significant according to Genentech boss Robert Swanson.

PHARMACIA SELLS INSTRUMENTS UNIT

Pharmacia has sold the microscopic sectioning instruments business it acquired under the acquisition of LKB Produkter, to the UK-based instruments firm Cambridge Instruments for Skr-95m ($14.9m). The sale is in line with the Swedish company's plan to focus its diagnostics group's interests on immunodiagnostic systems and analytical instruments.

The fine sectioning instruments operation, which is based in Bromma near Stockholm, had sales in 1986 totalling Skr80m. Cambridge Instruments is a rapidly expanding concern with a turnover of approximately £116.5m ($192m).

DUTCH BOOST R&D SUBSIDIES

Dutch economic affairs minister Rudolf De Korte is proposing to boost research subsidies to firms by Dfl.43.4m ($21.5m). The ministry had originally earmarked Dfl.80.6m to encourage research and development projects in biotechnology, materials projects in biotechnology, materials technology and other important high technology niches.

Interest in the subsidies according to the ministry, has been so strong that many promising programmes would be lost if extra funds are not made available. The Dutch parliament still has to approve the extra funds. The ministry is also planning to increase the level of subsidies to firms by Dfl. 60m/year.

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MARKET INFORMATION

Market hit by plasticiser shortage

The price of octanol and butanol has risen due to the closure of a main manufacturing unit. The unavailability of these products has its direct effect on the shortage of plasticizers.

Shortage of phenol continues causing an increase in price by Rs. 4/- per kg.

In the dyes market the price of the dye intermediate ; Aceto Acetic Ester has also increased considerably.

Other dyes remained steady

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent — and, as such they are not FIRM PRICES as between a buyer and a seller. The prices are published only with a view to giving some ideas of market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

(Prices as on 12th November, 1987)

NDUSTRIAL CHEMICALS	Per kg.
mmonium sulphate	2.00
Ammonium phosphate (Mono)	14.50
Ammonium phosphate (DI)	12.00
Ammonium carbonate (DI)	17.00
mmonium bicarbonate	4.75
Ammonium chloride	5.50
Ammonium nitrate	4.50
senic white powder	21.00
Acrylamide	57.00
arium carbonate	6.00
Bleaching powder (33% Cl)	4.00
Borax (Granular)	14.00
Borax (Powder)	16.60
Boric acid (Tech.)	22.00
Bisphenol-A	58.00
Butyl carbitol	35.00
Caustic soda (Flakes)	7.50
Caustic soda (Solid)	7.75
Caustic soda (Lye)	6.00
Calcium chloride 70% (solid)	3.25
Calcium chloride 75-80% (fused)	3.50
Calcium chloride 96% (Anhydrous)	5.00
Calcium carbonate (PPT)	3.00
Calcium carbonate (Activated)	3.55
Camphor (Indian)	85.00
Cresylic acid	49.00
Cream of Tartar (Tech.)	[illegible]4.00
Citric acid (Belgium)	39.50
Citric acid Indian	39.00
Copper sulphate	15.25
Chromic acid	40.00
Cyanuric chloride	95.00
Cobalt oxide	280.00
Carbitol	52.00
Dicalcium phosphate (Anhydrous)	16.00
Ferric chloride (Lumps)	5.75
Ethylene urea	66.00
Glue flakes	8.45
Glue sheets	6.75
Gohsenol GH 17	71.00

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222/A, Virwani Industrial Estate, Western Express Highway,
Goregaon (East), Bombay-400 063. Phone : Resi.: 6722385

Hydro	33.00
Hyflosupercell	18+ST
Hexamine	29.00
Industrial Wax	25.00
Litharge	22.00
Lead Acetate (Tech.)	26.00
Lithopone	35.00
Magnesium chloride (crystal)	3.00
Menthol crystal (Flakes)	185+Ex.+ST
Menthol bold	205+Ex.+ST
Menthol crystal bold	245+Ex.+ST
Magnesium carbonate (Japan)	16.00
Magnesium carbonate (Indian)	15.00
Maleic Anhydride (per kg)	41.00
Mercury (75 lbs)	5.400.00
Nickel chloride	55.00
Oxalic acid	20.00
Peppermint oil (Rectified)	90+Ex.+ST
Potassium carbonate (Indian)	19.00
Potassium carbonate (Imported)	21.00
Potassium bichromate	22.00
Potassium phosphate (Mono)	14.00
Potassium phosphate (Di)	14.00
Polyvinyl alcohol (No. 117)	88.00
Polyvinyl alcohol (No. 173)	85.00
Polyvinyl alcohol (No. 208)	89.00
Paraformaldehyde	14.50
Phthalic anhydride 96%	23.25
Pentaerythritol	63.50
Paraffin wax	13.50
Rangolite (German)	60.00
Rangolite (Czech.)	42.00
Sodium sulphate (Fine)	4.00
Sodium sulphate (Coarse)	3.80
Sodium sulphide 50-52% (Flakes)	8.00
Sodium sulphide 58-60% (Flakes)	9.00
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite	13.00
Sodium chloride 80% (Spain)	88.00

Sodium chlorite 50% (Spain)	81.00
Santobrite (Indian)	36.00
Soda Ash (Tata)	4.00
Soda Ash (Birla)	3.50
Soda Ash (Imp.)	3.50
Sodium bicarbonate	5.25
Sodium bisulphite	4.50
Sodium silicate	3.00
Sodium acetate	6.00
Sodium alginate	165+ST
Titanium Dioxide (Anatase)	51+ST
Titanium Dioxide (Rutile — RCR$_2$)	67+ST
Tartaric acid (Crystal)	94.00
Trisodium phosphate	4.80
Thiourea	67+ST
Urea (Tech.)	2.60
Vacuum salt	1.00
Zinc Dust	30.00
Zinc Oxide	28.00
Zinc chloride powder (technical)	14.00
Zinc sulphate	4.00

SOLVENTS	Per kg.
Acetic Acid (Glacial)	12.75
Acetic Anhydride	28.00
Acetone	21.50
Adipic Acid	50.00
Aceto Acetanilide	60.00
Aniline Oil	44.75
Benzoate Plasticiser	33.00
Butyl Acetate	42.00
Butyl stearate	38.00
Butyl Acrylate	61+ST
Butanol	48.00
Benzyl chloride	24.00
Benzo trichloride	16.00
Benzoyl chloride	22.00
Benzyl Alcohol (FPC)	36.00
Bromine Liquid	42.00
Chloroform	24.5
Carbon Tetrachloride	11.0
Cyclohexanone	38.0
Cyclohexanol	44.0
Diacetone	27.5
Diethylene glycol (DEG)	30.5
Dioctyl Phthalate	45.0
Diallyl Phthalate	48.5
Dimethyl Phthalate	28.0
Dioctyl Adipate	52.0
Dibutyl Adipate	42.0
Dipentene	14.0
Dimethylamine 40%	12.0
Dimethylamine 60%	14.0
Ethyl Acetate	24.0
Ethyl Acrylate	46.0
Ethylene Dichloride	11.0
Ethylene Glycol	26.0
Formic Acid (Imp.)	30+ST
Formaldehyde	5.6
Glycerine (CP)	60.0
Glycerine (IW)	49.0
Hydrogen peroxide 50%	25.75
Iso Propyl Alcohol	23.50
Iso Butyl Alcohol	28.00
Monoethanolamine	46.50
Morpholine (Indian)	65.00
Melamine	33.00
Methyl Ethyl Ketone	35.00
Methyl Isobutyl Ketone	36.00
Methyl Acrylate	42.00
Methylene Dichloride	23.00
Meta Cresol	45.00
Nitrobenzene	16.50
Nitric Acid (Con.) (RCF)	2.6
Ortho Cresol	32.0
Phenol	38.25
Propylene Glycol	31.0
Polyethylene Glycol (No. 200)	40.00
Polyethylene Glycol (No. 400)	37.0
Polyethylene Glycol (No. 600)	42.00

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ACID GREEN V	ACID GREEN 16
ACID PATENT BLUE AS	ACID BLUE 7
ACID PATENT BLUE VS	ACID BLUE 1
ACID VIOLET 4BS	ACID VIOLET 49
ACID COOMASSI BLUE FF	ACID BLUE 15
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Resi : 512 1572/512 4452
Phone : 349080/345011

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Polyethylene Glyco (No. 6000)	60.00
Para Cresol	86.00
Styrene Monomer	30.00
Sorbitol	17.00
Trichloroethylene	24.25
Triethanolamine	41.50
Sulphuric Acid	2.10
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	11.75
Triethylamine	60.00
Vinyl Acetate Monomer	40.50
SOLVENTS	**Per Litre**
Benzene	8.50
N-Heptane	8.00
N-Hexane	8.75
Methanol	6.50
Solvent Naphtha Heavy	9.50
Solvent Naphtha Light	8.50
Toluene	9.80
Xylene	11.75
DYES INTERMEDIATES PRICES ARE WITHOUT TAX & EXCISE	**Per Kg**
Alphanaphthylamine	54.00
Aceto Acetic Ester (Methyl)	65.00
Alpha Naphthol (Imp.)	150.00
Ammonium Molybdate	170.00
Anthraquinone	80.00
Anthranilic Acid	62.00
2-Amino-4-Nitrophenol (Imp.)	140.00
Blue B. Base (Local)	235.00
Beta Naphthol (Atul)	68.00
Benzidine Dihydrochloride (BDH)	70.00
Bromamine Acid	380.00
BON Acid	107.00
Chicago Acid	275.00
C. Acid (Imp.)	260.00
Coach Acid	58.00
Cyanuric Chloride (Japan)	124.00
2, 4, DNCB	26.00
Dihydrothio PTOS (Imp.)	500.00
Dimethyl Aniline	53.50
Diethyl Aniline	135.00
Di-amino stilbene d'sulphonic Acid	115.00
3, 3-DCB (Imp.)	155.00
Gamma Acid (Atul)	160.00
H. Acid (Atul)	150.00
G. Salt	56.00
Isophthalic Acid	39.00
J. Acid	265.00
J. Acid Urea	270.00
K. Acid	95.00
MDPS (German)	200.00
MNA	75.00
Meta Urido Aniline	135.00
MPD (Local)	125.00
MPD (Japan)	150.00
Naphthenic Acid	11.00
N-Methyl J. Acid	395.00
N-Methyl Aniline	140.00
Napthalene crude	13.60
Naphthalene (Refined)	18.00
Ortho Anisidine (OA Imp.)	84.00
Ortho Dichloro Benzene (CDCB)	10.00
OT Base	93.00
Para Dichloro Benzene (PDCB)	16.00
Para Anisidine (PA-Imp.)	110.00
Para Anisidine (PA-Local)	87.00
PNA	66.00
Para Cresidine (Imp.)	325.00
Para Amino Azo Benzene (India)	120.00
PNCB	27.50
Para Amino Acetanilide	140.00
1-Phenyl 3-methyl-5 Pyrazolone	110.00
Phenyl J. Acid	300.00
Para Amino Benzoic Acid	170.00
PT Base	88.00
Rhoduline Acid	425.00
Resorcinol	137.00
Resist Salt	18.00
Sodium-Naphthionate	82.00
5-Sulpho-Anthranilic Acid	60.00
Sulpho Tobias Acid	90.00
Sulphanilic Acid	26.00
Trichloro Benzene (TCB)	[illegible]
Tobias Acid (Imp.)	105.00

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Tel. : Factory : 692391 Resi.: 625735

Bombay Dyes Market

(Prices as on 12th November, 1987)

ACID COLOUR	Per Kg
Acid Violet 4BS	143.00
Acid Maroon V	110.00
Acid Orange II	77.80
Acid Orange IIY	63.05
Acid Red A	107.25
Crosein Scarlet MOG	155.00
Acid Scarlet 3R	99.90
Acid Red 38N	135.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Green V	330.00
Acid Patent Blue AS	250.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	121.95
Acid Black BX	98.40
Acid Black Wax	135.50
Procinil Yellow GS (I.C.I., UK)	265.00
Procinil Red GS (I.C.I., UK)	530.00
Procinil Blue RS (I.C.I., UK)	315.00
Procinil Scarlet G (I.C.I., UK)	600.00
Procinil Orange G (I.C.I., UK)	250.00
Procinil Rubine (I.C.I., UK)	550.00

DIRECT COLOURS	Per Kg
Yellow 3GX	88.10
Sun Yellow RCH	124.40
Fast Yellow GCH	141.15
Yellow CFG Hly. Conc.	312.00
Fast Yellow GS	111.65
Fast Yellow CHRS	95.45
Viscose Orange A	166.15
Fast Orange GR	133.75
Red	86.90
Dark Tan	78.25
Red IIR	72.55
Red 4B	169.10
Bordeaux BW	132.30
Fast Scarlet 4BS	166.55
Red 12B	170.55
Bordeux Hly Conc.	194.00
Cotton Red N	117.05
Brill. Fast Helio B	278.00
Brill. Fast Helio 2B	297.00
Brill. Fast Helio 2RS	136.20
Brill. Fast Helio BS	116.10
Brill. Violet Extra	128.40
Blue 2B	86.60
Blue G	170.50
Sky Blue FB	188.25
Copper Blue GR	147.00
Fast Greenish Blue GL	114.60
Developed Black BT	116.10
Blue NB-2B	300.20
Blue NB-2BC	185.30
Developed Black NB-BH6	185.30
Green B	111.65
Green NB-B	188.25
Green 2B-N	188.25
Brown MR	154.40
Brown CN	107.25
Golden Brown G	140.35
Catechin G	120.50
Omega Tan	126.40
Catechin GS	102.80
Black E Hly Conc.	142.60
Black E Extra Hly Conc.	142.60
Black NB-ER Hly. Conc.	310.50

DISPERSOL COLOURS	Per Kg
Yellow 6G Powder	143.80
Red B 3B Powder	247.80
Red B 2B Powder	323.20
Red CB Powder	439.15
Red D2B Powder	477.40
Violet C 4R	521.90
Blue BG Powder	235.45
Blue BN Powder	103.75
Blue D 2R Powder	476.25
Navy BT Powder	243.90
Blue B 2G Powder	210.20
Black BT Powder	182.60
Blue BR Powder	390.20
Yellow 7GL	338.60
Yellow 5RX	218.80
Yellow 3G	367.25
Yellow	140.00
Yellow AL	135.30
Yellow Brown REL	247.50
Yellow FFL	463.60
Gold Yellow GG	259.70
Pink REL	247.00
Red REL	468.65
Red 2B	327.40
Red FB	324.20
Red Violet FBL	469.85
Orange 3R	196.65
Violet 3R	280.60
Violet 6R	485.75
Violet RL	275.45
Scarlet RR	214.85
Rubine 3B	223.05
Rubine CB	364.90
Blue GL	318.95
Blue BGF	636.55
Navy Blue RE	270.40
Brown 3REL	200.40
Black GEL	324.20
Dark Brown 3B	317.40

BASE COLOURS	Per Kg.
Fast Yellow GC	80.20
Fast Orange GC	135.45
Fast Scarlet R	166.80
Fast Scarlet RC	126.65
Fast Scarlet RCR	99.05
Fast Scarlet G	121.65
Fast Scarlet GN	91.50
Fast Scarlet GG	72.70
Fast Scarlet GGS	72.70
Fast Red B	203.20
Fast Red RC	119.15
Fast Red R Flakes	149.25
Fast Red TR	166.80
Fast Red TR Oil	183.15
Fast Red RL	237.10
Fast Red KB Oil	201.95
Fast Bordeaux GP	201.95
Fast Garnet GBC	94.05
Fast Violet B	505.60
Fast Blue BB	521.45

NAPHTHOL COLOURS	Per Kg
ASG	217.00
AS	143.00
ASSW	279.75
ABBS	188.15
ASBO	195.65
ASD	175.60
ASOL	179.36
ASTR	279.75
ASPH	279.75
ASE	196.05
ASEI	184.40
ASLB	1632.60
ASBT	1817.00
ASWG	143.00
ASSG	397.70
ASSR	480.60

PROCION COLOURS	Per Kg.
Golden Yellow HR	181.80
Brill. Yellow H4G	117.85
Supra Yellow H-8GP	168.55
Brill. Yellow HE8G	166.95
Yellow H-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	243.95
Yellow M GR	326.05
Brill. Yellow M 4G	177.10
Brill. Yellow M 8G	332.30
Yellow M 3R	217.60
Brill. Orange H 2R	241.85
Brill. Red H 7B	157.95
Brill. Orange M 2R	313.15
Brill. Red H 8B	169.45
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.30
Brill. Red H-F3B	243.45
Brill. Magenta HB	167.00
Brill. Red M 5B	98.90
Brill. Red M 8B	173.70
Brill. Pink MB	137.10
Brill. Magenta MB	121.55
Brill. Purple H-3R	180.20
Brill. Purple H-7R	175.40
Navy Blue H 3R	298.50
Brill. Blue H-GR	366.55
Brill. Blue H 5G	173.10
Blue H 5R	283.85
Brill. Blue H 7G	178.70
Brill. Blue H 7RX	358.15
Turquoise HA	234.45
Supra Blue H-3RP	335.70
Supra Turquoise H 2GF	181.50
Blue H-ERD	305.80
Navy Blue H ER	258.60
Blue H 5RX	269.30
Navy Blue M 3R	310.95
Brill. Blue MR	331.70
Brill. Blue M RX	214.20
Brill. Blue M-G	382.30
Blue M 4GD	344.60
Navy Blue M RB	318.75
Turquoise M-G	197.85
Brill. Blue M GX	302.50
Blue 3R Acra Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide (per kg.)	285.00
Green H 4BD	269.80
Green H-E4BI	169.80
Red Brown H 1F	143.25
Orange Brown H 28	209.05
Brown M GRN	188.80
Black H-N	283.35

SULFUR COLOURS	Per Kg.
Navy Blue	99.85
Green G	198.55
Black Grains Extra	63.05
Black Grains OG	64.55
Black GXE Conc.	61.60
Black GXE	52.75
Black GXR	61.60
Black Grains 800	54.20
Black EXR Grains	64.55
Black EXR Grains 800	51.25

VAT COLOURS (ICI)	Per Kg.
Yellow 5G Powder Fine	673.15
Yellow 5G Supra Disperse	439.30
Yellow 5G Acra Con.	628.75
Yellow 3R Powder	588.85
Gold Orange 3G Pdr. Fine	952.15
Brill. Orange 6R Pdr. Fine	624.35
Gold Orange 3G Supra Disp.	601.30
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	997.80
Brill. Red 3B Supra Disp.	713.20
Brill. Purple 4R Conc Pdr.	470.75
Brill. Purple 3R Acra Powder	690.85
Brill. Purple 2R Hly Conc.	597.90
Brill. Purple 4R Supra Disp.	500.05
Brill. Purple 2R Acra Conc.	625.95
Blue R Powder Fine	542.15
Blue BC Conc. Pdr. Fine	522.50
Blue BC Acra Conc. Pdr. Fine	762.70
Blue R Conc. Pdr. Fine	577.65
Blue RR Supra Powder	629.35
Blue Conc Powder	645.80
Brill. Blue 2R Hly Conc	378.55
Bril. Blue 2R Supra Disp	115.65
Dark Blue 2R Powder Fine	389.25
Blue BC Supra Disp.	359.40
Jade Green XBN Powder Fine	438.20
Jade Green XBN Acra Conc. Powder	823.90
Jade Green 2G Pdr. Fine	419.65
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Ptg. Paste	125.40
Olive Green B. Pdr. Fine	399.90
Olive Green B Supra Disp.	308.25
Jade Green 2G Supra Disp.	496.00
Jade Green XBN Supra Disp. (N)	327.30
Olive D. Pdr. Fine	444.30
Olive OMW Pdr. Fine	698.55
Olive OMW Supra Disp.	538.05
Olive R. Pdr. Fine	422.95
Olive R Supra Disp.	363.90
Olive D Supra Disp.	361.70
Olive D. Ptg. Paste	193.00
Olive Green B. Ptg. Paste	199.10
Olive Green B Acra Conc.	542.75
Olive R Acra Conc.	640.00
Olive Green B Acra Conc	542.75
Brown R Pdr. Fine	835.00
Brown G. Pdr. Fine	795.00
Brown R Pdr. Fine	659.75
Dark Brown 3R Pdr. Fine	685.00
Brown G. Supra Disp.	449.90
Brown 2G Supra Disp.	554.00
Brown R Supra Disp.	422.95
Brown BR Powder	719.00
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	414.55
Brown G Acra Conc.	733.95
Brown R Acra Conc	766.00
Grey M. Powder Fine	768.80
Grey M. Supra Disp.	585.45
Blue BC Acra Conc Pdr. Fine	762.70
Direct Black AC Pdr. Fine	474.70
Direct Black AC Supra Disp.	330.35
Direct Black CH Supra Disp.	393.20
Direct ACD Ptg. Paste	217.15

Delhi Market

DELHI: NOVEMBER 13 (NNS) : — A sharp rise of Rs. 650 at Rs. 7250 per kg. in tartaric acid provided the main feature of trading in the local chemicals market during past week, says NNS. The spurt was also attributed to poor import prospects from France along with higher Bombay advices and inadequate stock position. Zinc oxide recorded a handsome gain of Rs. 1500 at Rs. 30000/34000 per tonne followed by higher prices quoted by manufacturers. Copper sulphate marked up sharply by Rs. 50/100 at Rs. 1600/1850 due to paucity of supply.

Titanium dioxide Anatase edged up by Rs. 250 at Rs. 49.50 per kg. and good stockists support along with fall in arrivals from Kerala. Titanium dioxide RC.822 quoted higher by Re. 1 at Rs. 57 on speculative activities. In the absence of arrivals from the mandis of U.P. coupled with good export enquiries from Pakistan, menthol flake and bold increased by Rs. 5 each at Rs. 155 and Rs. 177 per kg. Mentha oil hardened from Rs. 116 to Rs. 121.

Caustic soda solid and flakes flared up by Rs. 30 and Rs. 20 to Rs. 380 and Rs. 390 in the beginning of the week owing to paucity of supply, and sustained demand shown by millers but later thanks to fresh offerings of Gwalior Rayon quality caustic flake declined by Rs. 10 at Rs. 370 and caustic soda by Rs. 5 at Rs. 385 per kg. yet showed a hike of Rs. 15/20 then previous level.

Stable bleaching powder (Shri Ram) advanced from Rs. 90 to Rs. 94. Stable bleaching powder KCI and MODI also recovered by Rs. 2/3 at Rs. 85 and Rs. 90 in anticipation of hike in its prices by makers. Boric acid technical marked up by Rs. 20 at Rs. 1000 on dwindling stock position. Ammonium bicarb eased slightly by Rs. 3 at Rs. 125 per 25 kg. on satisfactory supply as well as lack of demand by consumers. Sodium nitrite dropped by Rs. 50 in the absence of enquiries.

Camphor Thal eased by Re. 1 at Rs. 96 and camphor powder by Rs. 2 at Rs. 86 on reduced demand. Chatkolight softened by 50 paise at Rs. 40 in the absence of enquiries, while hydro Damosha and Kalali ruled static at Rs. 34.50 and Rs. 36 thanks to good demand shown by gur khandsari makers. Sufolight ruled static at Rs. 50. Naphthalene balls declined by Rs. 10 at Rs. 150 due to lack of seasonal consumption.

Dyes and colours remained unchanged at their previous level.

(DELHI MARKET RATES AS ON NOVEMBER 13, 1987)

Ammonia Bicarb (per 25 kg)	125.00
Mercury (per flask)	7,700.00
Soda ash (per bag)	272-287.00
Ammonium Chloride (per 50 kg.)	110-180.00
Caustic Soda solid (per 50 kg)	.385.00
Caustic Soda flakes (per 50 kg.)	370.00
Citric acid (per 50 kg.)	2050-2150.00
Stable Bleaching Powder Shriram (per 25 kg.)	94.00
Stable Bleaching Powder KCl (per 25 kg.)	85.00
Stable Bleaching Powder MODI (per 25 kg.)	90.00
Sod. Bicarbonate (per 50 kg.)	250.00
Sod. Hydro Sulphite (per kg)	30.50-36.50
Rangolite (per kg.)	40.50-75.00
Boric acid Technical (per 50 kg)	1000.00

Paraffin wax (per 50 kg.)	580.00
Tartaric acid (per 50 kg)	7,250.00
Borax Granular (per 50 kg.)	520.00
Borax Crystal (per 50 kg.)	540.00
Sodium Nitrite (per 50 kg)	630.00
Sodium Nitrate (per 50 kg.)	400.00
Camphor Thal (per kg.)	96.00
Camphor Powder (per kg.)	86.00
Menthol Bold (per kg)	177.00
Menthol flakes (per kg)	165.00
Menthol medium (per kg)	155.00
Glycerine (per kg.)	45-55.00
Sodium Silicate (per quintal)	300.00
Hexamine (per kg.)	26.00
Acetic Acid Glacial (per kg.)	14.50-18.00
Copper Sulphate (per quintal)	1,600-1,850.00
Formic acid (per kg.)	30.00

Formaldehyde (per kg.)	6.00
Hydrogen Peroxide (per kg)	30.00
Calcium Carbonate (per tonne)	2,500-4,000.00
Acid Slurry Soft (per kg.)	25.00
Acid Slurry Hard (per kg.)	32.00
Phosphoric Acid (per 50 kg.)	810.00
Pot. Nitrate (per quintal)	900-1,200.00
Pot. Permanganate (per 50 kg.)	2,300.00
Sod. Bichromate (per 50 kg.)	1,025-1,125.00
Tri-sod. Phosphate (per 50 kg.)	310-330.00
Titanium Dioxide Anatase (per kg)	49.50
Titanium RC-822 (per kg)	57.00
Zinc Oxide (per metric tonne)	30,000-34,000.00
Phenol Carbolic Acid (per kg.)	28.00
Carbon Tetrachloride (per kg.)	16.50
Chloroform (per kg.)	26.00
Sodium Sulphate (per m. tonne)	3,100-3,300.00
Naphthalene Balls (per 50 kg)	1050.00

DYES & COLOUR	Per Kg.
Naphthol AS	150.00
Naphthol ASG	235.00
Naphthol ASBS	200.00
Naphthol ASTR	302.00
Naphthol ASOL	191.00
Naphthol ASBO	208.00

DIRECT DYES	Per Kg.
Black E. Conc.	92-150.00
Diazo Black B.T.	125.00
Green B.	115.00
Blue 2-B	86.00
Sky Blue FB	200.00
Basic Auramine 'O' Conc.	55-100.00
Basic Rhodamine B. 500%	220-300.00
Basic Methylene Blue	92-130.00
Basic Violet	142-160.00
Basic Malachite Green	160-185.00
Acid Orange	45-52.00

Madras Market

Trading in the Madras chemical market remained dull, with no major activities seen in commodities. Prices remained static at last week's levels.

In the Madras stock market Tamil Dadha dipped by Rs. 2 at Rs. 25.50, while Oswal Agro old and new lost Rs. 2 each at Rs. 106 and Rs. 95 respectively. Subdued trend was noticeable in other stocks and activity was moderate.

(MADRAS MARKET RATES AS ON NOVEMBER 17, 1987)

Aluminium (Ram) DCL (per tonne)	1,700.00
Acetic Acid Glacial (per kg)	15.00
Ammonium Acetate (per kg)	18.00
Ammonium Bicarbonate (per 25 kg)	138.00
Ammonium Chloride India (per quintal)	1,900.00
Ammonium Chloride Spic (per tonne)	1,700.00
Bleaching Powder (per 25 kg)	103.00
Borax Granular (per 50 kg)	1,000.00
Carbolic Acid (per kg)	18.00
Chromic Acid Flakes (per kg)	26.00
Calcium Chloride DCM (per 50 kg)	255.00
Caustic Soda (S) (per 50 kg)	310.00
Caustic Soda Flakes Andhra (per tonne)	360.00
Caustic Soda Flakes Mettur (per tonne)	368.00
Caustic Soda Flakes DCM (per tonne)	365.00
Citric Acid Deshi (per 50 kg)	3,400.00

Cobalt Oxide (per kg)	280.00
Copper Sulphate (Ram) (per 50 kg)	825.00
Cresylic Acid (per kg)	45.00
Formic Acid (per kg)	40.00
Formaldehyde (per kg)	11.00
Hydrosulphite of Soda Ind. (per kg)	35.00
Hydrosulphite of Soda Imp. (per kg)	38.00
Hydrogen Peroxide BASF (per kg)	29.00
Magnesium Carbonate Ind. (per kg)	32.00
Magnesium Chloride Pure (per kg)	28.00
Oxalic Acid (per 50 kg)	900.00
Manganese Sulphate Fert. (per 50 kg)	265.00
Manganese Sulphate Tech (per 50 kg)	240.00
Mercury (per 3.45 kg)	9,000.00
Potassium Bichromate (per kg)	19.00
Phosphoric Acid (per kg).	15.00
Stearic Acid (per kg)	18.00
Soda Ash Tata (per 75 kg)	275.00
Soda Ash Birla (per 75 kg)	365.00
Sodium Bichromata (per kg)	155.00
Sodium Bicarbonate Tata (per 50 kg)	165.00

Sodium Bicarbonate Birla (per 50 kg)	175.00
Sodium Cyanide Brigs (per kg)	900.00
Sodium Nitrate (per 50 kg)	390.00
Sodium Oxide (per kg)	1,050.00
Sodium Cyanide GDR (per kg)	50.00
Sodium Nitrite Bags (per 50 kg)	530.00
Sodium Silicate (per 50 kg)	130.00
Sodium Bisulphite Aswin (per 50 kg.)	185.00
Sodium Acetate (per kg)	19.50
Sodium Sulphate Powder (per tonne)	3,288.00
Sodium Sulphide (S) (per tonne)	5,200.00
Toluene (per kg)	25.00
Trisodium Phosphate (per 50 kg)	290.00
Urea Tech (per kg)	185.00
Zinc Oxide (per kg)	30.00
Zinc Chloride (per 50 kg)	500.00
Acetone (per kg)	29.00
Benzene (per kg)	26.00
Carbon Tetrachloride (per 100 kg)	1,500.00
Cellosolve (per kg)	50.00
Chloroform (per kg)	25.00
Diacetone Alcohol (per kg)	29.00
Dibutyl Phthalate (per kg)	33.00
Diethylene Glycol (per kg)	30.00
Sorbitol (per kg)	31.00
Dioctyl Phthalate (per kg)	32.00
Isopropyl Alcohol (per kg)	45.00
Methyl Ethyl Ketone (per kg)	48.00
Nitrobenzene Indian (per kg)	14.00
Trichloroethylene (per kg)	24.00
Triethanolamine (per kg)	42.00
Turpentine OIL (per kg)	8.00
Phenol (per kg)	29.00
Isobutanol (per kg)	22.00
Paraffin Wax (per bag)	700.00
Alkyl Benzene (per kg)	320.00
Pentaerithritol (per kg)	59.00
Glycerine (per kg)	48.00
Phthalic (per kg)	29.00
Hyflosupercell (per kg)	25.00
Copper Oxide (Ram) (per tonne)	1,500.00
Zinc Chloride Solid (per kg)	11.00
Zinc Sulphate (Ram) (per tonne)	4,500.00

MATERIALS IMPORTED

BOMBAY
(From 9-11-87 to 13-11-87)
(Cost of Imported Item is CIF Value)

AEROSIL 200 FUMED SILICA : From West Germany : Rallis India Ltd., 620 kgs., Rs. 49,600.

ALUMINIUM OXIDE SYNTHETIC : From Germany : Indravadan & Co., Ahmedabad, 2,000 kgs., Rs. 30,159.

ANTIMONY OXIDE : From Belgium : Peico Electronics & Electricals Ltd., 2,000 kgs., Rs. 82,634.

CALCIUM CARBIDE : From Poland : Industrial Oxygen Co. P. Ltd., 3,00,000 kgs., Rs. 11,70,000.

CALCIUM TUNGSTATE : From Germany : Kiran X-ray Screens Ltd., 250 kgs., Rs. 1,45,133.

GLYCERINE : From Pakistan : Indian Dyestuff Inds. Ltd., 17,000 kgs., Rs. 3,15,914; From West Germany : Sarabhai Chemicals, Baroda, 19,500 kgs., Rs. 3,60,892.

GUM BENZOIN : From Singapore : Laxmi Traders, 2,662, kgs., Rs. 19,973.

HIGH DENSITY POLYETHYLENE : From Czechkoslovakia ; Fibre, Plastic Corpn., 12,500 kgs., Rs. 87,500.

HYDROXYLAMINE SULPHATE : From West Germany : Vichow Labs. P. Ltd., Hyderabad, 18,000 kgs., Rs. 4,46,018.

HYFLOSUPERCEL : From USA: Uttamlal Exp. P. Ltd., 6,192 kgs., Rs. 28,491 : 18,576 kgs., Rs. 85,472.

LOW DENSITY POLYETHYLENE : From Yugoslavia : K. Raheja Mercantile Corpn., 10,000 kgs., Rs. 84,185.

MAGNESIUM OXIDE (LIGHT): From Japan : Anand Rubber & Cycle Inds., 1,000 kgs., Rs. 75,494.

MOLYBDENUM TRIOXIDE (REFINED) : From UK; Anupam Colours & Chemical Inds., 500 kgs., Rs. 43,254.

OLEYL CETYL ALCOHOL : From Germany : Nayaful Chemicals P. Ltd., 2,040 kgs., Rs. 46,216.

POLY PROPYLENE : From Yugoslavia : Veepee Finance P. Ltd,. 620 kgs., Rs. 49,600.

SODIUM CHLORATE : From Sweden: Wimco Ltd., 61,200 kgs., Rs. 3,97,645.

TITANIUM DIOXIDE : ANATASE : From UK : Grasim Inds. Ltd., Nagda, 4,000 kgs., Rs. 93,110.

MADRAS
(From 9-9-87 to 21-9-87)
(Cost of Imported Items is CIF Value)

AMINO GUANIDINE BICARBONATE : From Japan : Hindustan Photofilm Mfg. Co. P. Ltd., 400 kgs., Rs. 971.

ANTIMONY TRIOXIDE : From Belgium : Indian Organic Chemicals Ltd., 5,175 kgs., Rs. 2,11,686.

AROMATIC CHEMICALS : From Japan : Sri Balakrishna Perfumery Works, 140 kgs., Rs. 35,634; From Switzerland : Karnataka Soaps & Detergents Ltd., Bangalore, 200 kgs., Rs. 47,987.

CARBON BLACK : From Malaysia : MRF Limited, 1,00,000 kgs., Rs. 6,83,430.

DIMETHYL OCTANOL : From USA : Vimal Fragrants, Bangalore, 1,000 kgs., Rs. 1,40,

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(Gujarat)
Phones : 2970/2841

DINITRO-ORTHO-CRESOL TECHNICAL : From France : McDowell & Co. Ltd., 5,680 kgs., Rs. 2,60,444.

INSOLUBLE SULPHUR : From UK : MRF Ltd., Madras, 35,000 kgs., Rs. 8,54,869.

LABORATORY CHEMICALS : From UK : IIT., Madras, 2 kgs., Rs. 3,906.

METHYL BROMIDE : From USA : Food Corpn. of India Ltd., 40,000 kgs., Rs. 12,29,681.

METHYL ETHYL KETONE : From UK : Mehta Indl. Corpn., 8,580 kgs., Rs. 67,578

SODIUM CYANIDE BRICKS : From FRG : Sarvodaya Chemical Co. Ltd., 2 kgs., Rs. 28,534.

SULPHUR : From USA : The MMTC of India Ltd., 35,00,540 kgs., Rs. 61,52,654.

TRICHLORO SALICYLIC ACID: From UK : Indian Explosives, 90 kgs., Rs. 20,124

Australia turns to export of hightech scientific instruments

Australia is winning significant high-technology export orders by making many of the tools of modern science — items like finely crafted syringes which can deliver as little as 0.05 microlitre of liquid (about 1/1000 of a drop) for mass analysis testing.

Dr. Clive Coogan, an Australian scientist prominent in the national drive for high-technology exports, calculates that there are now at least 168 companies involved in scientific and medical instrumentation.

Dr. Coogan, executive scientist, science and industry liaison with the Commonwealth Scientific and Industrial Research Organisation and director of the Australian Scientific and Industrial Association, estimates that their turnover increased about 25 per cent last year to approach $500 millions. Most of the production was exported.

"Australian science is thriving," Dr. Coogan said. "Australians produce about two per cent of the world's science and technology papers from 0.4 per cent of world population. With only limited funds Australian scientific inventors have had to be cost-effective: their designs tend to avoid the over-complexity of many foreign competitors. Sturdiness and simplicity is preferred.

One of the leaders in the field is Scientific Glass Engineering Proprietary Limited (SGE) of Melbourne. Today, the firm's 100 employees make 2,000 products sold in 60 countries, including 240 types of syringes, — a world-patented design of glass-lined metal tubing, valves and fittings, and capillary and liquid chromatography columns. One big seller, a jet separator, is used by all leading makers of mass spectroscopy equipment.

The company has just launched on the world market aluminium-coated silica capillary tubing with bore sizes down to two microns. This represents the next generation of capillary columns for gas chromatographs — more flexible, stronger and able to withstand far higher temperatures than conventional tubing. For example, it requires special skills to make glass tubing where the hole is only 1/25th the thickness of a human hair.

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Trade mark of Chemox
Industrial Corporation Under
Reg. No. 322485 in class 1st.
its unauthorised use by an
other person will amount
to a criminal offence
punishable imprisonm
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Citric Acid from Citurgia. The name that spells international quality

The name Citurgia is today synonymous with Citric Acid of the finest quality.

Citurgia caters to more than just one need in more than just one industry. Besides the traditional usage of Citric Acid in food, soft drinks, confectionery and drugs, today the uses of Citric Acid extend to new areas:

- In the textile printing and dyeing industry it provides 'STABLE pH' conditions for polyester and nylon. As also for acrylic prints curing and cotton-resist printing. Citric Acid has successfully replaced imported Tartaric Acid because of its excellent quality, low costs and easy availability. Also, it is a very safe acid compared to other organic and inorganic acid salts.
- Citric Acid prevents flavour deterioration, rancidity and discoloration in edible oils.
- It imparts an acidic taste to dry powdered drinks.
- It is also used as a descaling solution.

Citurgia Biochemicals Ltd. is the largest producer of high quality Citric Acid in India. Besides catering to the domestic demand, Citurgia's Citric Acid is exported to USA, Japan, Germany, Australia, Iran, Malaysia, Sri Lanka and other countries.

Citurgia Citric Acid-India's No. 1

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